

Bob Cooper's

NOVEMBER 15 2003

# SatFACTS

MONTHLY



Reporting on "The World" of satellite television in the Pacific and Asia

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**1-watt L-band  
"killer" xmtr**

**REVIEW:  
2 new  
blind-searchers**

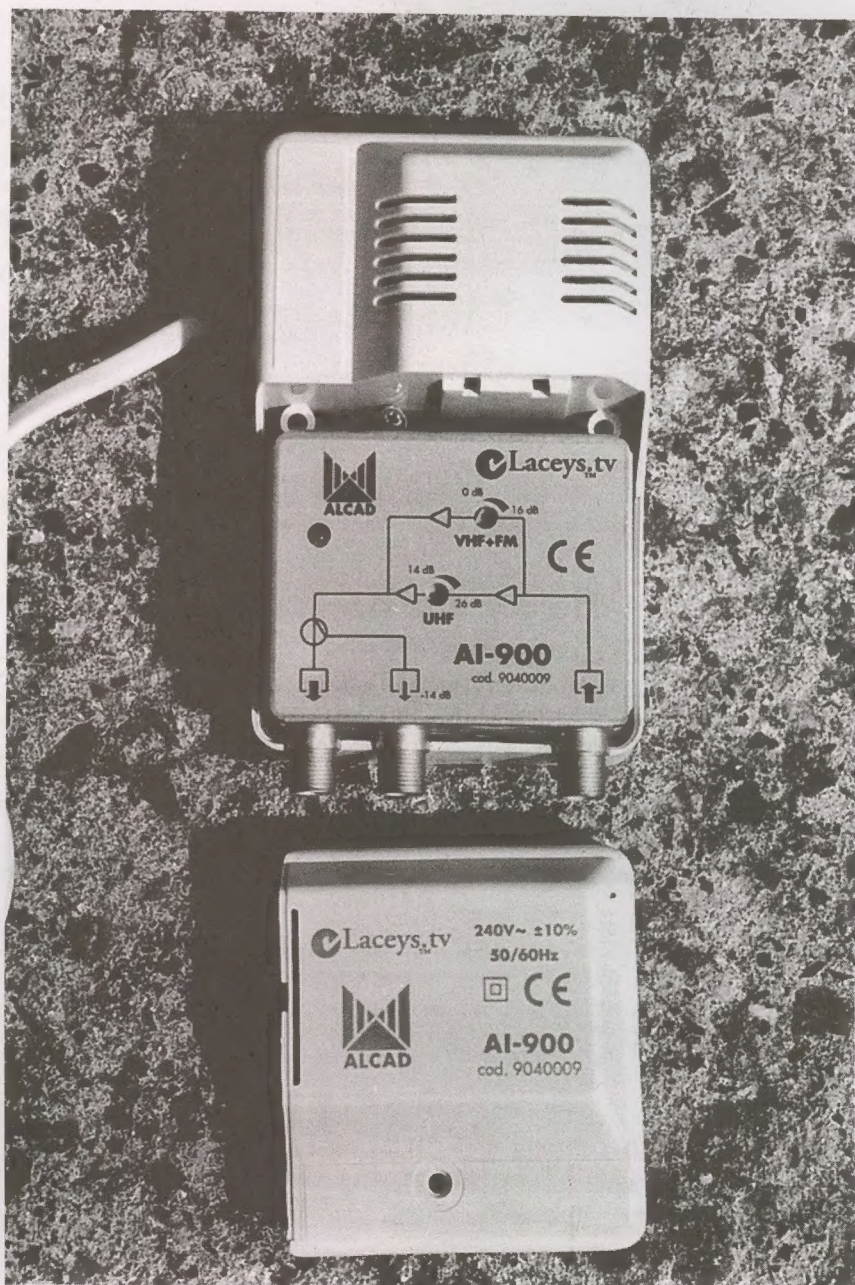
**Actives/passives  
for digital  
terrestrial**

- ✓ Latest Programmer News
- ✓ Latest Hardware News
- ✓ C1 major changes!
- ✓ Observer Reports

Vol. 10 ♦ No. 111

Price Per Copy:

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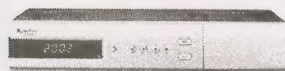






# Phoenix Technologies

Satellite Equipment & Accessories One Stop Supermarket



Made in Korea

- Digital Audio Output (S/PDIF)
- Dolby Digital
- Wide Screen (16:9) Hot-Key
- S-VHS, CVBS & RGB Video Outputs

**HUMAX ACE S Receiver**  
(Irdeto V2.06 CAM embedded)

**\$300**

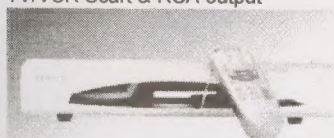
**Supernet digital receiver**  
(Irdeto V2.09 CAM embedded)

**\$270**

**SPACE 5300A CI Receiver**  
(Two Common Interface Slots)

- Auto PID correction
- C & Ku band input
- PAL/NTSC auto converter
- 5000 channels
- Picture in picture EPG
- DiSEqC1.0/1.2 control
- TV/VCR Scart & RCA output

**\$180**



CDVB5300A

**SPACE 2300 digital receiver**

- Auto PID correction
- C & Ku band input
- PAL/NTSC auto converter
- 5000 channels
- Picture in picture EPG
- DiSEqC1.0/1.2 control
- TV/VCR Scart & RCA output

**\$140**

## Phoenix JT3100T Digital Terrestrial Receiver

- Super-Fast Channel Scan
- Electronic Program Guide
- Channel Rename Function
- Software Upgradeable

**\$220/each (for one box of 6 unit)**

**\$200/each (for five boxes of 30 units)**

**NextWave 3220 FTA digital receiver (Made in Korea)**

- C & Ku band input
- PAL/NTSC auto converter
- 5000 channels Picture in picture EPG
- DiSEqC1.0/1.2 control
- TV/VCR Scart & RCA outputs

**\$160**

**NextWave 3220C digital receiver**  
(Two common interface slots) (Made in Korea)

- C & Ku band input
- High symbol rate >45,000
- PAL/NTSC auto converter
- 5000 channels Picture in picture EPG
- DiSEqC1.0/1.2 control
- TV/VCR Scart & RCA outputs

**\$220**

**Optus C1 Aurora Kit**  
**Supernet digital receiver**

- (Irdeto cam embedded)
- 11.3 GHz/Universal Ku
- LNBF65cm dish, Mount
- bracket, 30m RG6 cable

**\$395/set**  
Aurora card \$95

**LBC, ART, Al Jazeera Kit**  
**Supernet digital receiver**

- (Irdeto cam embedded)
- C-band LNBF
- 2.1m Mesh dish
- 3' Pole
- 30m RG6 cable

**\$495/set**  
Subscription fee  
\$30/month\*

**Irdeto 2.06B CAM**

**\$160**

**65cm offset dish**

**\$27**

**11.3 Ku LNBF**

**\$25**

**Universal Ku LNBF**

**\$25**

**Universal Mount**

**\$15**

**RG 6 Dual cable (305m/box)**

**\$85**

**Gold Card (10/bag)**

**\$85**

**Silver Card (10/bag)**

**\$135**

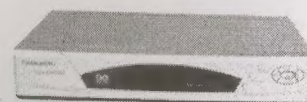
**Satellite finder**

**\$35**

**Free to air kit**

Including dish, LNBF,  
digital receiver, etc.

**Start from**  
**\$3xx**



**Changhong 1000 Digital Receiver**  
Aston 1.05 Cam embedded

*Best Value For Indian & French*

(C-band on Asiasat 3s & Ku  
band on Intelsat 701)  
C & Ku band input, 2000  
Channels,

**\$200**

Full range of C/Ku band satellite dish - panel & mesh, prime & offset, from 45cm to 4.5m

Full range of C/Ku LNBF - Dual output, one cable solution, C/Ku combination

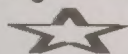
Full range of actuator - From 12" light to 36" heavy duty

DiSEqC 1.2 Positioner & SupperJack EZ2000 Positioner

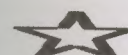
2.4 GHz AV sender and Remote extender

RG6 Cable and Motor cable

Full range of satellite accessories



## THIS MONTH'S SPECIALS



SPACE 2300A FTA Digital Receiver \$1400/(2 box, 5units/box)

Phoenix V-Box \$600/(box of 10units)

18" Phoenix Actuator \$360.00/(3 box, 4 units/box)

Irdeto 2.06B CAM \$1400/(box of 10units)

Phoenix 2.3m Mesh dish \$1650/(pallet of 10 sets)

Zinwell LNBF 15K C-band LNBF \$648/(box of 24)

RG 6 Cable \$700/(10 box, 305m/box)

65cm offset dish \$125/(box of 5sets)

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Email: [satellite@phoenixstrong.com.au](mailto:satellite@phoenixstrong.com.au)



# SatFACTS MONTHLY

ISSN 1174-0779

is published 12 times each year (on or about the 15th of each month) by Far North Cablevision, Ltd.

This publication is dedicated to the premise that as we are entering the 21st century, ancient 20th century notions concerning borders and boundaries no longer define a person's horizon. In the air, all around you, are microwave signals carrying messages of entertainment, information and education.

These messages are available to anyone willing to install the appropriate receiving equipment and, where applicable, pay a monthly or annual fee to receive the content of these messages in the privacy of their own home.

Welcome to the 21st century - a world without borders, a world without boundaries.

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our **TENTH** year!

## COOP'S COMMENT

Closing the "Rolf Chapter."

In SF# 62 (October 1999) we carried the first in a series of reports concerning the arrest and charging of South African Rolf Deubel, in Bangkok, with violation of (Thailand) law prohibiting (so we thought) the "cloning" of pay-TV smart cards. Pre-Thailand, Rolf, aka Mad Max, was the single person responsible for "cracking" the then-Galaxy pay-TV smart cards and teaching others in Australia how to tune-in to pay-TV, without paying.

During 1999, through much of 2000, SatFACTS operated our own web site and we daily posted reports of how his incarceration in Thailand was progressing. Unlike anyone else in or out of the industry, SF had a reporter (an attorney, in fact) in Bangkok who had the ability to learn what we believed was really happening to the German born immigrant to RSA who turned the Irdeto V1 world upside down by going to a Swiss laboratory where he "shaved" an original Irdeto V1 card to discover the secrets of how the system worked.

We felt the "Deubel story" was bigger than a mere series in SF and encouraged and got support from a major US TV network which was keen to create a "made for TV movie" about his pre-arrest and incarceration period. The story, as told by Rolf, had all of the elements of an international best seller. Big time money laundering, high officials in the Thai military "for sale" to the highest bidder, a direct relative of the King of Thailand involved in a "gay" murder. It got "better" the further one dug.

*Too good, in fact.*

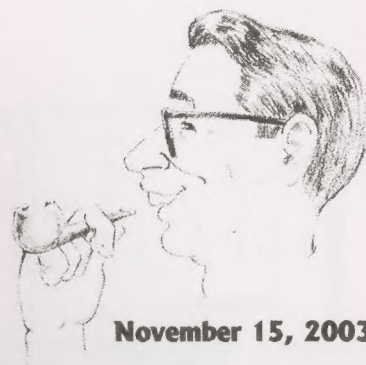
What began as a "simplistic story" of Irdeto vs. Mad Max quickly became an international thriller involving heads of government and even the integrity of the Thai national currency.

In June 2002 we arranged for Rolf to visit us in NZ for five weeks. We paid his expenses, arranged his "hosting" and recorded 74 hours of questions and answers on audio tape as he "dumped" for us his experience and involvement with the Thai military. It went further than a mere "scam" to bust the Thailand pay-TV system "protected" by Irdeto. *Far further.*

We knew we were in over our heads; the "killings" and brutality he related were but the tip of an iceberg which could quickly engulf us if we were foolish enough to try to turn this "story" into a book. You think about things like this when you have an 8-year old son. Would the book be an international "best-seller?" *No doubt.* Would the people involved be safe walking to the grocery store? *Unlikely.*

Rolf returned to NZ in February 2003, with wife Connie, ostensibly to work on "the book." We knew differently. In the interim between June 2002 and February 2003, we found an Australian author with more guts and balls than (we suspected) common sense and turned Rolf and his story over to that individual. There are simply some places where a person nearing the end of his own life does not wish to go. This was one of those places.

The tapes? In Australia. Well, the *originals* are there. Our copies plus a 90 page notebook of "live notes" are locked in a bank vault to be opened upon our death; if needed. The next time someone offers you a "MOSC" card, think about Thailand. *It's a very dirty business.*



November 15, 2003



RD in NZ; dishes are his "hobby."

### In Volume 10 ♦ Number 111

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Side by side testing - two (new) blind-search models -p. 10  
Digital Terrestrial: Passives and actives -p. 18

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Supplemental Data -p. 26; With The Observers -p. 27; C1: Major changes -p. 28; At Sign-Off (The  
vultures are circling) -p. 31

### -On the cover-

When do you amplify DVB-terrestrial reception? How do you amplify it? Are you "stuck" with old-fashioned analogue installation habits? p. 18

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## LETTERS

### S-band LNBs

"Have been having great success with 2.4GHz link hardware described in SF (#109). Strapped small black and white CCD camera to a friend's radio remote control aeroplane, along with 2.4 transmitter and tiny battery pack, using whip antenna. As he flew the plane to over 1,000 feet, it send back great high resolution images using small whip antenna and 2.4 GHz commercial receiver on ground. Next step is to replace CCD with colour camera, switch to an ex-Galaxy MMDS antenna for receive and hopefully then to add the Chinese built 2.4 GHz (S-band) LNB described in SF for October."

TD, Victoria

Caution! The radio control link can range can easily be exceeded by the supersensitive 2.4 GHz return link using LNB receive package - don't fly further than the plane still has contact with the radio control link or you could be searched for a lost plane "last seen on 2.416 GHz flying towards downtown Melbourne!"

"I have numerous uses for this LNB; can you provide the contact in China?"

AL, Christchurch

We received more than a dozen requests for contact information regarding the S-band LNBs described on p. 18 SF#110. For those who did not read carefully, these LNBs are available with L-band outputs and user selectable (at time of order) inputs of 2.3-2.7 (LO 3.650; the one we used for our tests), 2.5 - 2.9 (LO of 3.850) and 2.3 - 2.9 (LO of 3.950). One reader asked about a version covering 2.1 to 2.4. We suggest anyone interested contact product manager Xie Xiaoyang via email at [airui@mail.hf.ah.cn](mailto:airui@mail.hf.ah.cn). These have been incredibly efficient, helpful folks and all of our experience with them to date has been positive.

### Missing CNBC

"I have a client in the deep south of NZ, an American, who subscribes to Sky. Now that CNBC is being eliminated for Sky, he is ropeable because he feels he needs the consistent updating on the financial and other commodity markets. He has a Kiwi wife who advised him to 'buy a REAL satellite dish' rather than pulling up stakes and moving back to America. Can you help?"

RS, South Island

Perhaps. But not with CNBC who apparently has lost the NZ plot (they do subscribe to SF and maybe somebody there in Singapore can advise us if we are wrong?). Alternative. Bloomberg is FTA on C-band PAS-2, California Bouquet, 3900 and if you set aside the weekend golf-auto racing coverage which CNBC features, their 7/24 coverage of the world's financial markets is by most professional estimations a superior service to CNBC anyhow. Our advice - put in a REAL C-band dish for this fellow and introduce him to Bloomberg!

## PROGRAMMER PROGRAMMING PROMOTION

## UPDATE

NOVEMBER 15, 2003

**C1's major-major changes.** Throughout October Optus continued on a frantic pace of modifying use of both Aurora and pay-TV transponders including changing of Symbol Rates (SR) for both to new apparent-defacto Sr 27.800 (was Aurora 30.000 or pay-TV 29.473). Receivers able to find their way "home" (to "homing transponders") came through it OK - but many others required reinstallation of both Aurora and pay-TV parameters. As this issue of SF goes to press, the changes have slowed down but not stopped; we update to press-time on p. 28 here.

**Globecast MUX C1/B3** is apparently in for major change affecting thousands of receive systems. On October 31, Globecast B3 (152E) changed from 12.532.3V to 12.525.3V and Symbol Rate went from 15.000 to 30.000 (FEC remains 2/3). All of this is in preparation for a November month-long transition during which anyone using Globecast on C1 (12.367V) will be asked to reacquire the service on the new B3 frequency of 12.525.3V. All Zee-TV subscribers, FTA users of the various ethnic services, CA users of the specialised channels will require installer assistance. Peter Evans ([pevans@bsa.com.au](mailto:pevans@bsa.com.au)) is responsible for arranging repoints and in particular needs assistance in New Zealand (Australia's BSA-exComet is doing that country).

**TARBS "comes out."** By monitoring the install rate from SF reader-installers doing contract work on behalf of ethnic telecaster TARBS, we have had serious doubts about their past-claims of "hundreds of thousands" of homes subscribing. TARBS characterises their subscribers as (1) "reluctants" - first or second generation immigrants who find the Australian adjustment "challenging," (2) "hybrids" - accepting Australia as their home but who still do not feel totally "at home" in the country, and, (3) "blendeds" (sic) who accept Australia completely. To boost sale of TARBS service (65 channels) to "hybrids" and "blendeds" they will now offer Optus-owned "The Movie Network" three channel package (Movie 1, Movie Greats, Movie Extra) as a stand-alone "tier." Pricing: \$49.95 monthly includes CNN, ESPN, Cartoon Network, Turner Classic Movies and ethnic channels; add \$12.95 p/m for The Movie Network (\$62.90 total). TARBS says they are negotiating for additional English language channels as well for their PAS-8 Ku band delivery. Subscriber numbers? "Mr Boulos (said) TARBS has 50,000 subscribers and 250,000 viewers with an average watching time of 5 hours per day." That would be A\$2,500,000 per month for a service "eating up" 5 outward-bound Ku transponders on PAS-8. No, they are still not to the break-even point. To help get past their present situation, TARBS will begin accepting advertising for their channels in January, targeting the "multicultural" ethnic advertising market including Australian Government advisory messages presently appearing in ethnic newspapers, on ethnic radio and SBS TV.

**C1 reduction in power?** In fact, New Caledonia, Vanuatu in late July-August were seeing solid C1 Vt and Hz signals on dishes in the 1.2-1.6m range. Now comes reports from Papua New Guinea that signal levels on Aurora Vt transponders have dropped down by as much as 5 dB on NA beam while NANZ beam comes through "OK." Are there other reports? Solomon Islands??? NZ levels unchanged.





# DaTuM10 Terrestrial Digital and Analogue Television Instrument

- **Automatic Digital signal measurement.**
- **Simultaneous view of Seven channels.**
- **Spectrum Analyser with variable Spans, MAX, MIN, FREEZE and Dual markers.**
- **Auto Carrier to Noise ratio measure.**
- **50 memory 7 program Data Logger.**

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Tel (03) 9783 2388 Fax (03) 9783 5767

e-mail: info@laceys.tv

Branches in Sydney, Ulverstone and Woolgoolga

DaTuM10 is a new hand held TV Signal Level meter that measures 45 to 860 MHz Analogue and Digital, COFDM and QAM. The signal levels of any 7 channels can be shown simultaneously in the new histogram function. Spectrum Analysis and Expanded Spectrum with 2 Markers enable a broad range of detailed and specialised measurements to be made. A moulded rugged Rubber Holster protects the DaTuM10 against knocks and falls. The keypad has been designed for use even in humid and dusty environments and a Pulse Encoder knob speeds function selection.

It detects Digital from Analogue, automatically adjusting the signal level read to Digital Channel Power and tuning to the centre of the channel. Measurements include Signal Level, D.C.P., Carrier to Noise Ratios, Vision to Audio Ratio, and Bit Error Rate estimation. The graphic LCD can be read in darkness or daylight. Clear Menus guide the user through functions which include mast or line amplifier powering and Data Logging. DaTuM10 employs precision signal level detection circuitry (superior to AGC detection) that reliably measures signals as weak as 20dBuV and provides Peak and Average detectors.

Internal Ni-MH battery life can be extended with optional external batteries and the instrument can recharge whilst still being used from the mains switch mode power supply included or 6V DC.

DaTuM 10, exciting instrumentation that needs neither a mortgage to buy it or a sherpa to carry it.

©2003 Laceys.tv



#### Coship supporters arise

"Re SF#110 'At Sign-Off with comments about Coship. Let's try to get this right. The factory considers your comments libellous. First of all, your comment (p. 26) 'Buy with caution.' I want this removed forthwith - totally inappropriate. Further, the 3188C is totally different to the earlier unit. Why would the factory improve something they have supposedly stopped making? It has been upgraded for the European market with PAL-NTSC, RF loop and so on. The power supplies are supplied free to me with each shipment - have had none go on us yet - more than 800 units sold. And, they, Coship, designed the 3188C; nothing to do with DMS (all total crap). The Coship factory does not have old stock laying around - they run production lines as per orders. The 3188C is here to stay. We require you to correct these remarks in your next magazine."

Peter Escher, peter@satlinknz.co.nz

"Buy with caution" is our editorial comment. We stand by it. When everyone involved in the Coship world proves they are a dependable member of our small industry, we'll consider revising that caution. Until that time, our personal views are our personal views and an editorial statement reflecting our concern for buyers of this product. There is nothing libellous about having a personal view of a particular situation. At 800 units sold and NZ\$100 profit each, my goodness - how your bank account grows. The publicity about your product apparently has not been bad for your sales!

"If Peter Escher is receiving 'end of the line' Coships, as in your 'At Sign-Off' thoughts, why are the ones he is now selling (and selling very well into Europe) have a new face and an added bonus of an UHF modulator that can be switched to any PAL system in the world? And why do your receiver listings include the line 'Buy with caution'? I would tread very warily as your anti-Coship articles could be considered libellous. The real question is, 'Why is there not anyone prepared to sell these (receivers) in Europe?' (I believe) that US importer DMSi has manipulated the 'non availability' in the USA and therefore Europe to promote their awful Satwork model. Or are you (at SatFACTS) angling users toward Satwork so that you can sell them (in the Pacific?). It is my deduction from your writings that the real reason is you intended to be the sole agent for the Satwork in the Antipodes. The truth is that DMSi had absolutely nothing to do with the design of, or software, of the Coship. They merely stumbled upon it because they were selling Coship at the time. They then designed one for themselves around another processor that would do the same job; the Coship using the Fijitsu processor while I believe the Satwork to be using the STi 5518 processor. The real truth is that blind search is here to stay; I see it as the future for all receivers."

Roy Carmen, UK (r.carmen@ntworld.com)

Roy's lengthy writings are now posted as a courtesy by Craig Sutton at [www.apsatv.com](http://www.apsatv.com). Our editorial "take" on the Satwork; p. 10, here. (Yes, both letters edited to fit space available.)

## HARDWARE EQUIPMENT PARTS

## UPDATE

NOVEMBER 15, 2003

**People who travel frequently** have come to not expect quality television reception in their motel or hotel lodging facility. It goes with the territory that when 50/500 TV sets are tied to a common (headend) origin point, unpleasant things between the headend and the individual room sets create reception blemishes. Those who have become reasonably successful in selling DVB-T (digital terrestrial) set-top boxes in Australia are learning that consumers are much more expectant of what digital will do for them than often the technology can deliver. Ghost-riddled reception on analogue, with snow and power line interference, is "routine" and few if any complain. But when the big jump is made to digital, consumers anticipate every form of interference will not only be gone but it will never come back. In any form. One of those who has been successful in making the terrestrial transition to digital, Leon Senior of Strong Technologies, points out "consumers who are introduced to digital in their home become extremely agitated if by some cause or another there is any level of interference in their picture (or sound). Even when, as is often the case, it is caused by the something malfunctioning at the terrestrial digital transmission source. People who had ghostly images riddled with snow and motor vehicle interference on Thursday are on Friday suddenly extremely critical of any form of degradation after having digital installed. I warn installing dealers to be careful of the words they use in describing the results after digital is installed. It is not 100% 'studio clarity' (or some other near-perfect phrase) - all of the time. By painting false expectations, all they are doing is building in false anticipation. Digital is good; it is not perfect, yet!" For installation tips, see p. 18 here.

**Blind search.** Is there anything to "new" to be said? We think so and compare directly the lesser-known Innovia 3088 and the even lesser-promoted Satwork 3618 (p. 10). The Innovia comes to us previously hyped by no less than the UK's Roy Carmen who pronounces it, "the best of the three" (Coship 3188C being the third version), while the Satwork 3618 has previously been Internet web-site "trashed" by Carmen as "not suitable." We disagree with the severity of his "rating" and provide facts and numbers to substantiate our own findings. At the end of this epic, we believe, will be every receiver worthy considering including "Blind Search" as a standard software feature. But not yet. By the way - we had been "told" to expect a Coship 3188(C) for side by side testing but the supplier did not deliver it so for now we are limited to the Roy Carmen pronouncement (to [www.apsatv.com](http://www.apsatv.com)'s Craig Sutton) that the "Innovia is the best of the three."

**The fourth one.** Jason Racic ([www.aDigitalLife.com](http://www.aDigitalLife.com)) advises, "The Powtek is not a Coship copy or modification of the Coship. It is NOT made by Coship. The Powtek also does DiSEqC 1.0 and 1.2 plus other features as opposed to the Coship model."

**Garry Cratt (Av-Com P/L) advises,** "the price for a +/- 300 kHz stability (C-band) LNB has dropped from A\$650 each to a new A\$359 based upon a new source (the old source being CalAmp)." Those who require high accuracy narrow-band reception are advised to check this one



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 Fax: +61 8 9309 5210 www.sciteq.com.au

**SCITEQ**

ABN 34 009 235 090

Pty Ltd

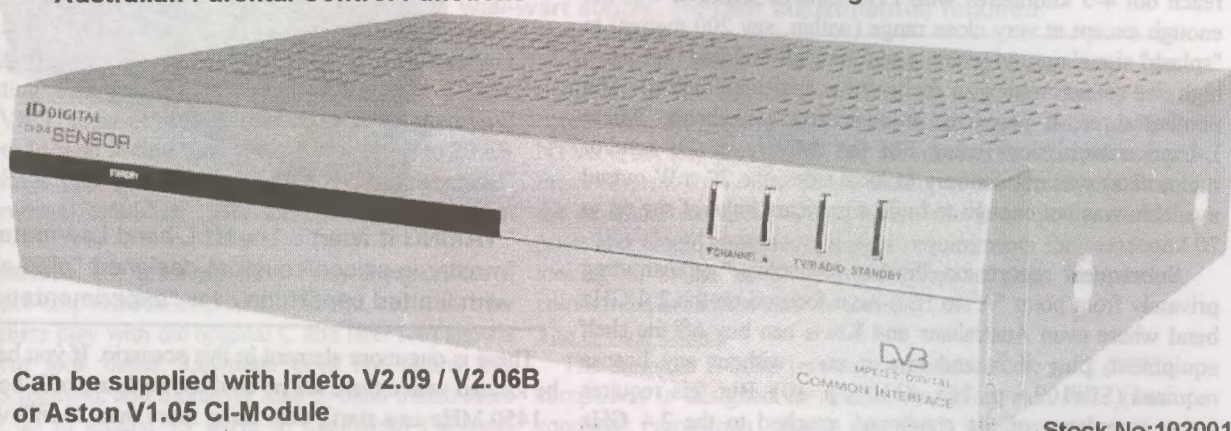
Introducing the NEW

# ID Digital CI-24 Sensor

Super Sensitive Tuner **G3**

## Features:

- Common Interface slot for Irdeto 1 & 2, Seca / Mediaguard, VIACCESS, Nagravision, Conax Cryptoworks and more.
- 1 - 45 Msym Symbol Rate
- Super Sensitive Tuner
- 4:3 or 16:9 aspect ratio
- Automatic Search for Asia/Pacific Satellites
- Australian Parental Control Functions
- Software upgradable from home PC
- Latest software FREE on the web
- DiSEqC 1.0 switching
- DiSEqC 1.2 positioning
- 22kHz Switching
- SCPC & MCPC from C / Ku Band
- Supports DVB Subtitling & DVB Teletext
- Electronic Programme Guide



Can be supplied with Irdeto V2.09 / V2.06B or Aston V1.05 CI-Module

Stock No:102001

## Conditional Access Interface

PCMCIA 1 Slot Common Interface

## Tuner & Channel

Input Connector F-type, IEC 169-24, Female  
 Frequency Range 950 ~ 2150 MHz  
 Input Impedance 75  $\Omega$  unbalanced  
 Signal Level -25 ~ -65 dBm  
 IF Frequency Zero - IF  
 LNB Power & Polarization Vertical: +13.5 V  
 Horizontal: +18 V  
 Current: Max. 500 mA,  
 Overload Protection  
 22 kHz Tone Frequency: 22 $\pm$ 4 kHz  
 Amplitude: 0.6 $\pm$ 0.2 V  
 DiSEqC Control Version 1.0/1.2 Compatible  
 Band Switch Control 22kHz Tone  
 Demodulation QPSK  
 Input Symbol Rate 1 - 45 Msym  
 FEC Decoder Convolutional Code Rate  
 1/2, 2/3, 3/4, 5/6 and 7/8  
 with Constraint Length K=7

## MPEG Transport Stream AV Decoding

Transport Stream MPEG-2 ISO/IEC 13818  
 Profile Level MPEG-2 MP@ML  
 Input Rate Max. 15 Mbit/s  
 Aspect Ratio 4:3, 16:9  
 Video Resolution 720 x 576 & 720 x 480  
 Audio Decoding MPEG/MusiCam Layer I & II  
 Audio Mode Single channel/Dual channel  
 Joint stereo/Stereo  
 Sampling Rate 32, 44.1 and 48 kHz

## Memory

Main Processor ST ST20C2+(81MHz)  
 Flash Memory 1 Mbyte  
 Graphic & System 8 Mbyte  
 DRAM

## A/V & Data In/Out

VIDEO RCA/Cinch, Video Output (CVBS)  
 AUDIO R/L RCA/Cinch Volume and  
 Mute Control (Resolution:  
 20 bits DAC, Max. 2 Vrms)  
 RS 232C Transfer rate 115,000bps  
 9 pin D-sub Type

## RF-Modulator

RF-Connector 75  $\Omega$ , IEC 169-2, Male/Female  
 Frequency 470 ~ 860 MHz  
 Output Channel CH21 - 69 for the Remodulator  
 TV standard PAL B/G/I/D/K  
 selectable by Menu

## Power Supply

Input Voltage 90 ~ 250 VAC  $\pm$ 6%,  
 50 Hz/60 Hz  
 Type SMPS  
 Power Consumption Max. 28 W  
 Stand by Power  $\leq$ 11 W

## Physical Specification

Size (W x H x D) 260 x 50 x 180 mm  
 Weight (Net) 1.3 kg

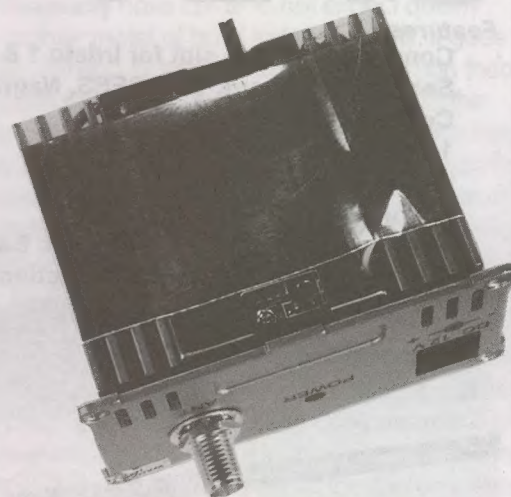


## Small, compact, and potentially lethal if mis-used

When SatFACTS introduced the first L-band frequency modulated (FM carrier) L-band transmitters (SF#83, p. 6) there were three forms of reaction. Number one - people in New Zealand and Australia quickly worked out, as the text related, that use of this low-power (20 milliwatt or 0.02 of a watt) transmitters in any portion of L-band (950 - 1450 MHz) was illegal unless you held a valid qualified amateur radio license and then you would be restricted to the 1250 - 1300 segment. Number two - while 20 milliwatts was enough to reach out 4-5 kilometres with LOS (line of sight), it was not enough except at very close range (within say 200 metres) to "splash" signal around within a serious built building (such as a high rise office building, a multi-storey apartment house). And number three, if you lived in a political jurisdiction where L-band transmissions using FM for delivery of TV (and/or radio, data) was not contrary to local rules, the 20 mW output available was not enough to build significant links of say up to 20 km.

Subsequent reports on "linking technology" (transmitting privately from point "A" to "B") have focused on the 2.4 GHz band where even Australians and Kiwis can buy off the shelf equipment, plug it in and turn it on - without any license required (SF#109 - p. 115, #110 - p. 10). But this requires some acceptance of the conditions attached to the 2.4 GHz non-license frequency range.

Basically, world-wide "every man and his dog" is using 2.4 GHz for portable wireless phones, WiFi data links, WLAN data links, surveillance cameras and a host of other new-age technologies. Which means there is in most areas, even remote areas, somebody who has "beat you to" the frequency range with unlicensed transmitters. Yes, by using directional transmit and receive antennas, and sufficient "transmission power" you can overcome many of these non-mutual user transmissions but in the process of engineering a "king of the hill" super system that simply drowns out those who were first in the frequency range, you become the nasty "bad boy" on the block. You also run the risk that someone with more bucks than common sense will work out that if you have moved to 1 watt of transmitter power to drown out their 30 milliwatts, the next step for them is 4 watts of power! Which explains the range of power levels on offer from firms such as Taiwan's Lawmate ([www.lawmate.com.tw](http://www.lawmate.com.tw)).



**TAKING it apart** - 1-watt L-band Lawmate is "mostly-in-silicon" custom designed "chip-amp" with limited opportunity for "experimentation."

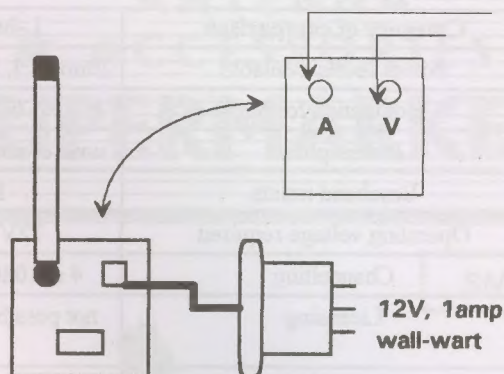
There is one more element in this scenario. If you happen to be located where there are no conflicts with use of L-band (950 - 1450 MHz as a start), then using more than 20 milliwatts for the transmit end becomes quite practical. Such a place? Fiji, for example.

Lawmate offers power levels from 50 milliwatts to 4 watts in both L-band and 2.4 GHz transmitters. The package is identical to the one-watt SF reviewed in issue #108 (p. 15); a relatively small cube measuring 60mm wide, 34mm height and 60mm deep (from front channel select button protrusion to rear of SMA fitting). It is provided with a 92mm tall transmit antenna "whip" (p. 7). The price is in the region of US\$240 through distributors such as [www.meritcctv.co.nz](http://www.meritcctv.co.nz).

Connection to the system is relatively simple but like the 2.4 GHz equipment of identical shape and size previously reviewed in SF (SF#109, p. 10), it does require some advance planning. First of all, there is the SMA fitting conundrum. A transition fitting (SMA to BNC or Type N, for example) allows you to couple the transmitter output to a suitable transmit antenna. SMA transition fittings are available from Australian supplier [www.allthings.com.au](http://www.allthings.com.au).

20 mW	98	92	80	60	<40	<40	<40
	↕	↕	↕	↕	↕	↕	↕
1 W	99+	95	92	86	74	62	49
	(kM) 0.5	1.0	2.0	4.0	8.0	16.0	32.0
	(#1)	(#2)	(#3)	(#4)	(#5)	(#6)	(#7)





**SIMPLE** is as simple does. The Lawmate packages lend themselves to instant set-up and turn-on at both 1.2 and 2.4 GHz. (1) Using provided (92mm at 1.2 GHz) "whip" antenna, (2) connect external RCA jack A(audio) and V(video) sources to transmitter, (3) select transmit channel (4-position slide switch) and (4) apply centre-positive 12V dc (1 amp) wall-wart supply. No user adjustment(s) required.

The primary advantage of using L-band is that because you are transmitting utilising wideband FM, a standard L-band analogue TVRO receiver can be employed. Furthermore, garden variety L-band in-line "line amps" offering 10 to 20 dB of signal voltage gain can be used as a form of "masthead" (receiving antenna) amplifier. But there are cautions even here.

L-band satellite TV receivers have been designed for a particular "pre-emphasis/de-emphasis" format, a trick the system designers play with the original C and later Ku) signals to make them look better. Lawmate does not follow this pre-emphasis regimen, and moreover their L-band transmitters deviate only up to around 13 MHz in bandwidth (whereas standard full transponder satellite signals deviate more in the 27 MHz region). Pre-emphasis allows the satellite uplinker to concentrate more of the typically colour-fine-detail information closer to the actual carrier centre frequency - resulting in more robust colour. But this only works when the receiver on the opposite end of the circuit has a de-emphasis circuit, to retard the accentuated information bringing it back to what one would see on a colour monitor in the TV transmitting studio. Between too little deviation and a lack of proper emphasis circuits, the colour quality in *any* Lawmate transmitter (whether L-band or 2.4 GHz) suffers. How significant is this?

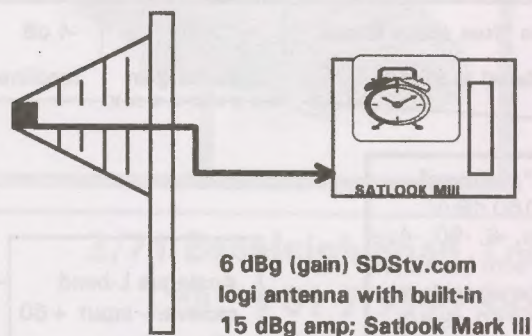
A Palcom model SL7700 L-band analogue receiver has sufficient "tweak circuits" (variables the user can "dial up") to compensate for most of this; colour looks pretty decent when NTSC is set into the Palcom and the receiver is adjusted using menu controls for narrow plus a setting of between 3 and 7 on the threshold extension. But it is not broadcast quality at this point and would probably not pass requirements for someone looking to create an inexpensive point to point link for a commercial broadcast activity such as TAB.

#### The L-band choice

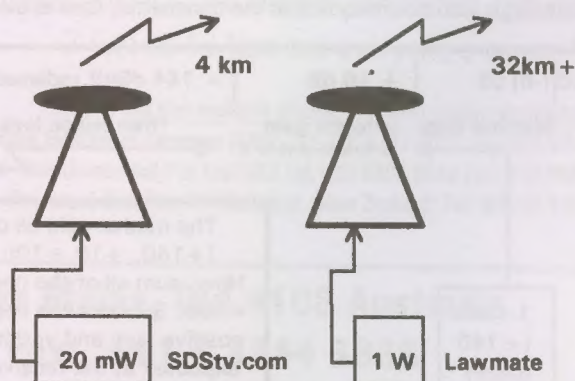
The one-watt L-band Lawmate transmitter like its 2.4 GHz companion is designed for indoor mounting with full (user supplied) protection from moisture. Unfortunately, that suggests the use of a suitable low-loss transmission line connecting the SMA transmitter output to a type F, BNC or N coaxial connector linking to the antenna. Transmission line losses at 2.4 GHz preclude all but very short (5 metres or less) RG6 transmission lines but at L-band line lengths to perhaps 15 metres will function although each metre of cable reduces the signal delivered to the transmit antenna. (SF#109, p. 10).

Our tests (illustration, bottom p. 6) were conducted using a SDStv.com "active logi" receive antenna connected to a SATLOOK Mark III battery operated signal level meter/receiver. At the transmit end, a 20 mW SDStv.com

**RECEIVE system for testing.** See table, p. 6. LOS (line of sight) over distances shown; reception monitored/measured on Satlook Mark III meter.



**TRANSMIT test system.** Identical SDStv.com Discone antennas through 2m of RG6 radiating 20 mW and 1 watt on two separate frequencies.





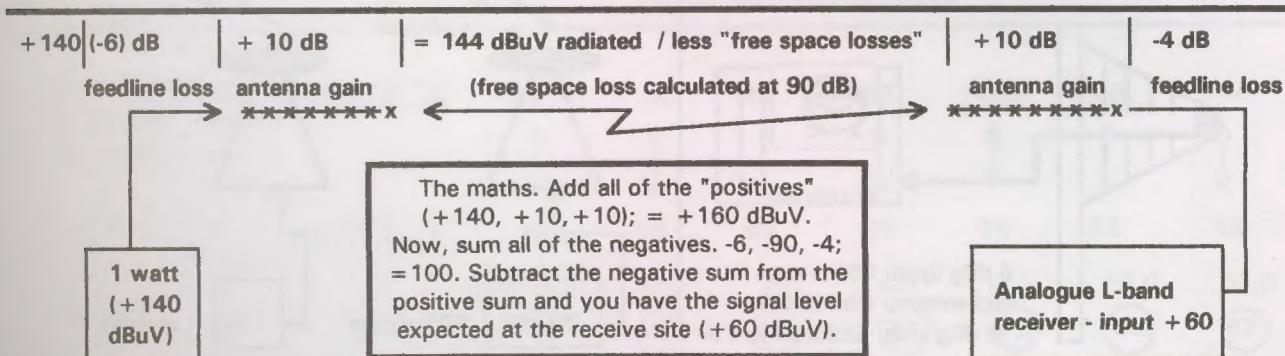
Category of comparison	L-band (950-1450 MHz)	S-band (2400-2483 MHz)
Power levels available	20mw (*), 50mw, 400mw, 1, 2, 4 watts	10mW, 50mW, 600mw, 1, 2, 4 watts
Modulation format	FM +/- 6 MHz typical; 6.6 aural subC	FM, +/- 6 MHz typical 6.6 aural subC
Pre-emphasis	none or small amount following NTSC	none or small amount following NTSC
Baseband inputs	RCA sockets A, V	RCA sockets A, V
Operating voltage required	12V dc, centre tip positive	12V dc, centre tip positive
Channelling	4 at 1080, 1120, 1160, 1200 MHz	4 at 2413, 2432, 2451 and 2470 MHz
Licensing	not possible many areas, not required others	license free as long as transmitter power (or EIRP- locally defined) not exceeded
Other users of channels	seldom any (see footnote **)	Significant in metropolitan areas
Mounting	indoor or in weatherproof container	indoor or in weatherproof container
Antenna	screw-in SMA fitting whip	screw-in SMA fitting whip
External antenna	thru SMA fitting, adapter to external ant	thru SMA fitting, adapter to external ant
Availability of accessories	wide range antennas, receivers	limited range antennas
Primary attributes	medium to long range; > 30km	ease of use, high access to structures
Primary negatives	illegal in developed areas	poor quality of receivers
Optional hook-ups	direct use of L-band receivers	With S-band LNB, use of L-band rcvrs
Transmitter costing	US\$125 to US\$250	US\$60 to US\$250
Receiver costing	"almost free" analogue L-band to US\$100 for brand new receiver	US\$80 to US\$200 (more expensive have multiple channel scanning built in)

\* - 20 milliwatt is SDStv.com 24 channel self contained transmitter covering 970 through 1430 MHz in 20 MHz steps. \*\* - Lawmate's 4 channels cover a region between 950 and 1200 MHz which unfortunately is heavily used for ground to air communications. Had they alternately elected 1200-1450 MHz, conflicts with pre-existing terrestrial users would not have been a major issue.

transmitter fed an omni directional Discone antenna in the region of 1290 MHz. Simultaneously, the Lawmate 1 watt transmitter fed a separate SDStv.com discone on a frequency closer to 1200 MHz. Seven measurement points were taken at distances from 0.5 km to 32 km - all LOS (line of sight). The SATLOOK has a mostly-linear signal level meter built into the display system and the numbers you see in the illustration relate "how much signal" we measured at each of the measurement points (99 is full up). For example, the 20 milliwatt transmitter registered a reading of 80 at a distance of 2 km while the 1 watt registered 92. The last measurement point where the 20 mW could be measured was 4 km - after which the "signal spread" from the lower power transmitter could no longer be detected. However, the 1 watt was still producing (noisy) pictures and sound at 32 kilometres. More power at the transmitter is one answer to creating improved coverage; high gain antennas first at the transmitter, than at the

receive site(s) is another. Microwave paths, whether 0.01 or 100km in length do not really care "where" the additional circuit gain is employed (whether at the receive end or transmit end; whether through electronic amplification raising the actual power level, or, by using larger passive gain antennas to raise the effective radiated or receive-captured power.). In any microwave circuit "path" between two points, there is a calculable amount of signal loss (spread). To offset this spreading out of the signal, you design antennas that "sharpen" the transmission beamwidth or elect to use amplifiers (at either the transmit or receive end) to add "positive dBs" to the calculation.

In the example below, knowing whether the "free space loss" is due to "signal spreading" or caused by signal absorption (such as trees blocking the path) is not a consideration. Path "loss," like path "gain," is neutral to the source.







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Blind Search is not a "dead issue"-

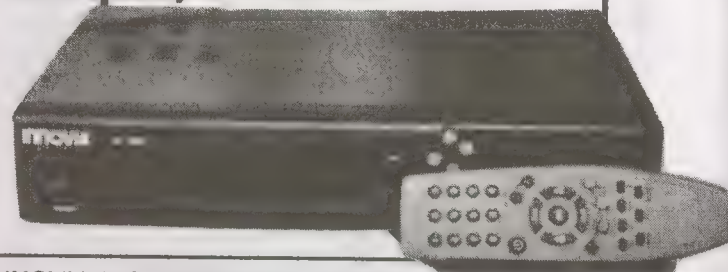
## Two models that do blind search - Coship is not that unique, afterall

From July onwards in SatFACTS there have been a series of reports concerning one special feature identified in a tiny handful of L-band digital receivers; "blind search." Depending upon whom you talk with, and their "secret agendas" relating to blind search, this function is either "the best thing to hit DXer/enthusiast IRDs since the introduction of the DVB2000 software for some Nokia models," or, a "sham."

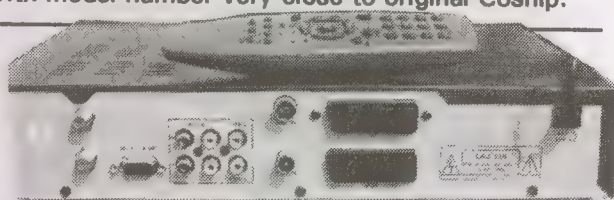
Far too much space has already been devoted to "she said/he said" reports regarding one particular blind search version, the Chinese built Coship 3188C. SatFACTS broke the ice with a skilful analysis of this receiver (SF#107, p. 6) prepared by contributor Roy Carman. What happened post the report is lost in a cloud of claims and counterclaims. Some said the 3188C was no longer available, some (including the factory) say it remains in production.

**Blind search?** Within menu screens, you select something the software designers call Blind Search. Then you define the blind search parameters; for example, you are asked "between what two frequencies - a lower L band frequency and an upper L-band frequency - do you wish to search?" If your LNBf creates L-band signals that fall between 950 and 1450, those are the two numbers you enter from the remote keypad. Then some models - but not all - ask you to establish the symbol rate parameters to be searched; such as 2000 Ksps (Msym/s) and 45000 Ksps (Msym/s).

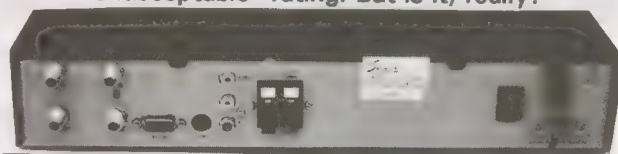
Some versions of blind search offer two "search increment speeds" while others offer one. The standard search increment is 4 MHz (i.e. start at 952 MHz, then jump to 956 MHz, 960 MHz and so on). The 2 MHz search increment jumps from the initial 952 MHz to 954 MHz, then 956 MHz and so on. Obviously, 2 MHz steps will increase the total time consumed for a full search by 100%. Most receivers have the ability to detect a narrow band SCPC carrier from a "distance" of 1 to even 2 MHz. So if the receiver was jumping from 952 to 956 and there was a SCPC signal at 954 MHz, the chances are



INNOVIA IDS 3088 further confuses aficionados with model number very close to original Coship.

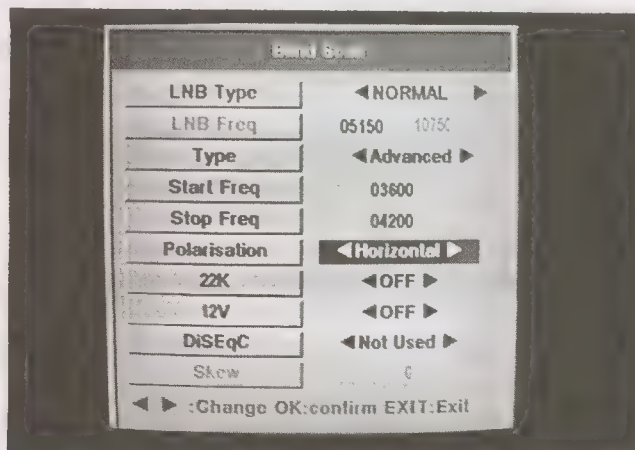
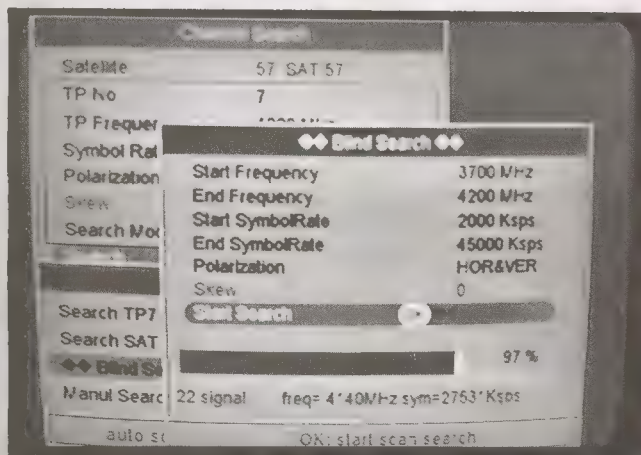


SATWORK ST3618 received Roy Carmen "totally unacceptable" rating. But is it, really?



quite good the receiver would detect this carrier and then "fine tune itself" to 954 MHz anyhow. But no guarantee that would happen - and thus the optional "filter tune" mode. All of this has a useful function when someone who lives for the

INNOVIA (left) and SatWork (right) on screen start-point blind search/scan menus. Very little about the two versions is similar; we find no common thread here (unable to agree even on what to call search/scan).





Comparisons	Coships 3188C	Satwork ST3618	Innovia IDS3088
Input fre range	950-2150 MHz	950-2150 MHz	950-2150 MHz
AC mains	100-240V, 50-60	90-250V, 50-60	90-250, 50-60
Input levels	-65/-25 dBm	-65/-25 dBm	-65/-25 dBm
Symbol rate range	2 - 45 MS/s	2-45 Ms/s	2-45 Ms/s
CPU	Fujitsu (*)	STi5518	Fujitsu
DiSEqC	v1.0 (***)	v 1.0	v 1.0, 1.2
L-loop-thru	yes	yes	yes
V/U aerial loop	no (***)	yes	yes
modulator	no (***)	yes (see text)	yes
Max Ch loading	2000 TV + R	??; 1,000?	3,000 TV + R
Max Bird load	18	50+ factory load	50+ factory load
LNB/Switching	13/18/12V; 22Hz tone	13/18/12V; 22 Hz tone	13/18/12V; 22 Hz tone
Mechanical polarizer	no	yes	no
SCART	no	no	yes, two

Comparisons	Coship 3188C	Satwork ST3618	Innovia IDS3088
RCA video socketas	one	one	two
RCA audio sockets	two (left, right)	two (left, right)	four (2 left, 2 right)
S-VHS socket	yes	yes	no
RS-232 socket	yes	yes	yes
Rear panel mains switch	yes	yes	no
PAL-NTSC	yes	yes	yes
Imparja PID verification?	no *****	no *****	unknown *****
Duplicate loading?	yes	possible - see text	not detected
"misses" SR below 2.000	yes (**)	yes (**); see text	yes

\*/ Coship claims to be upgrading to STi5518 CPU. \*\*/ Will load Sr's below 2.000 and play service if PIDs are entered; will not find on its own. \*\*\*/ Later versions 3188C reported to now include these features.

\*\*\*\*\*/ When Imparja transmits false or misleading PIDs, their service is no longer DVB-S "compliant" while the receivers are!

discovery of new services becomes aware of this auto-scanning ability.

There are two additional important considerations.

#1/ *Blind scan time*. A blind scan receiver using DiSEqC, 12V or other switching technology in conjunction with an appropriate LNB, can be told to automatically "scan through" all of the transponders falling between the two upper and lower frequency parameters the user sets, including *both* polarisations. As the receiver does this "magic," a memory file is building inside of the receiver. Each time it locates and defines the parameters for a SCPC or MCPC or data service, the receiver "logs" the information and adds it to a memory for ultimate display on an on-screen menu.

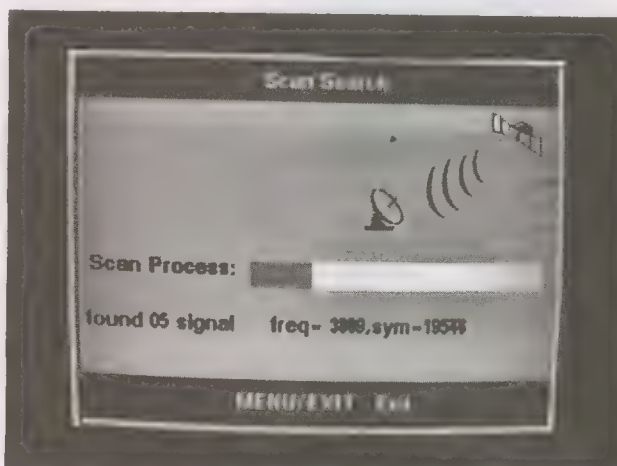
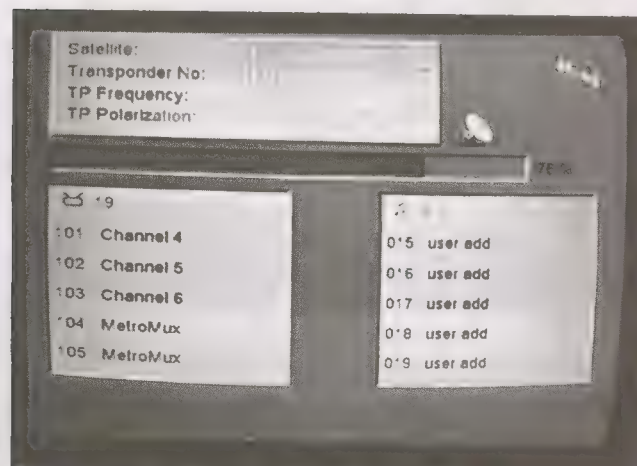
If a blind scan receiver requires one hour to work its way through all frequencies, all symbol rates and all FECs for a satellite such as PAS-2, most users would find that acceptable. On the other hand, if the blind search required five hours, this would tie up your receiver for that length of time and no other same-receiver functions could be performed. SatFACTS

reported on the very first (known to us) blind search receiver in SF#78. It required as long as sixty (!) hours to blind search a single satellite. Alas, technology marches - sixty minutes now might seem quite respectable for the same search and six minutes quite extraordinary. But how about 60 seconds???

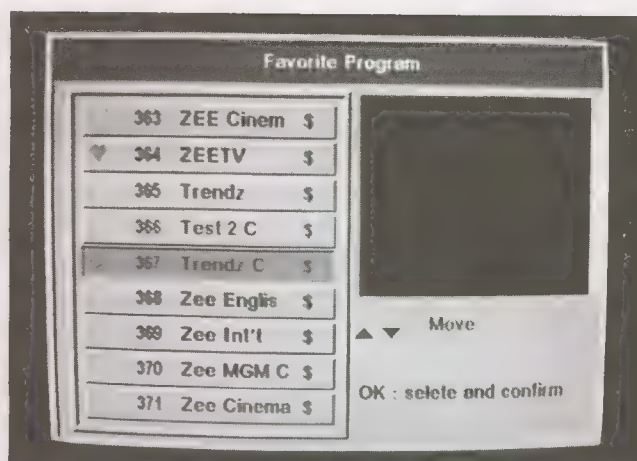
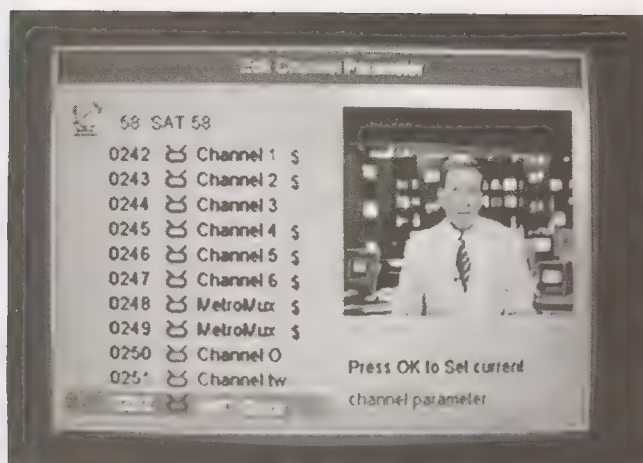
#2/ *Blind scan redundancy*. Ideally, when a receiver goes back for a second or third (etc.) "bite" of a particular satellite, it would recognise SCPC and MCPC transponders previously found and memorised; not merely adding them to an ever growing memory. Having CCTV with identical parameters stacked up in memory for each time you run a search is a pretty useless waste of limited memory space. The Blind Search should be designed so that once a satellite has been scanned, you can rescan it at a later time or date and it will only impress newly found services to that satellite's memory bank.

"Falsing" is another undesired artefact. If you are in the "fine detail" 2 MHz search mode and the IRD finds 953 MHz while stopping at 952 and again when stopping at 954, your memory loading doubles. This can also happen when the signal in

As the scan progresses, you have a running status report of the percentage of the sweep-width "done" as well as the number of MCPC/SCPC carriers interrogated - listing the parameters of the last found on the menu screen (Innovia left, Satwork right).







BLIND scanners create a list for memory addition which is "data saved" at the end of the scan sequence; once saved, ready for you to recall on a programme channel by programme channel basis. Innovia left, Satworks right.

question is at 954 MHz (L-band) and the receiver locates it from 952 and again from 956. Of course once a search is completed, you can call up the full memory list on screen and do "editing" (eliminating those you see as obvious "duplicates"). Yes, of course it would be best if there were no "false entries" at the outset.

Processing speed. Software designers are asking the CPU (central processing unit) in the receiver to accomplish a tremendous number of "calculations" when directing it to go from 950 to 1450 MHz in either 2 or 4 MHz "steps," and then with each MHz step rip through every possible combination of symbol rates (2.000, 2.002, 2.004 and so on through 44.998) and - and , each of the FEC steps (1/2, 2/3, 3/4, 5/6, 7/8). So the receiver begins by moving to 952 MHz and then it sends Msym 2002 to the CPU. While it stutters on 952/2.002 it then zips FECs of 1/2, 2/3, 3/4, 5/6 and 7/8 past the CPU. Nothing found? Move to 954 MHz and repeat. And do this for both polarisations along the way!

Processing speed is determined by the quality of the CPU. Fujitsu's CPU is commonly employed in a wide range of receivers including the original Coship 3188C. There is a better processor, one that does things faster and with greater accuracy, according to people who know receiver designs; the STi5518.

There is confusion about how a receiver doing a "search" differs from a receiver equipped with "blind search." Virtually all receivers arrive in your hands preloaded with the parameters for some quantity of satellites, transponders, services. For example, if the factory loads the IRD with software instructions that list all of the services operating on As2, then when you connect the receiver up and select As2, the receiver knows what to look for; and where, using factory installed parameters. That is not a "blind" search.

"Blind" means that in addition to having factory preloaded service names and parameters in memory, the receiver is capable of locating and identifying transponders or services which the factory either neglected to include, or which have

Categorey	Satwork ST3618	Innovia IDS3088
<b>PAS-2 Vt</b> 950-1450 MHz	<b>(Lyngsat says 19TV, 1 radio)</b>	<b>(Lyngsat says 19TV, 1 radio)</b>
Services found	20TV, 3 radio	24TV, 4 radio
MC/SCPC found	7	5
Search time	88 seconds	153 seconds
Dupes/falsees?	can dupe; no false	none
<b>PAS-8 Hz</b> 950-1450 MHz	<b>(Lyngsat says 55TV, 37 radio)</b>	<b>(Lyngsat says 55TV, 37 radio)</b>
Services found	79TV, 37 radio	79TV, 39 radio
MC/SCPC found	12	12
Search time	75 seconds	142 seconds
Dupes/falsees?	can dupe; no false	none
<b>As2 Vt</b> 3600-4200 MHz	<b>(Lyngsat says 84TV, 24 radio)</b>	<b>(Lyngsat says 84TV, 24 radio)</b>
Services found	68TV, 26 radio	68TV, 26 radio

Categorey	Satwork ST3618	Innovia IDS3088
MC/SCPC found	15	15
Search time	106 seconds	163 seconds
Dupes/falsees?	can dupe; no false	none
<b>As3S Vt</b> 3600-4200	<b>(Lyngsat says 82TV, 12 radio)</b>	<b>(Lyngsat says 82TV, 12 radio)</b>
Services found	86TV, 8 radio	87TV, 10 radio
MC/SCPC found	10	11
Search time	112 seconds	177 seconds
Dupes/falsees?	can dupe; no false	none
<b>As3S Hz</b> 3600-4200	<b>(Lyngsat says 55TV, 8 radio)</b>	<b>(Lyngsat says 55TV, 8 radio)</b>
Services found	58TV, 10 radio	57TV, 9 radio
MC/SCPC found	17	16
Search time	110 seconds	175 seconds
Dupes/falsees?	can dupe; no false	none



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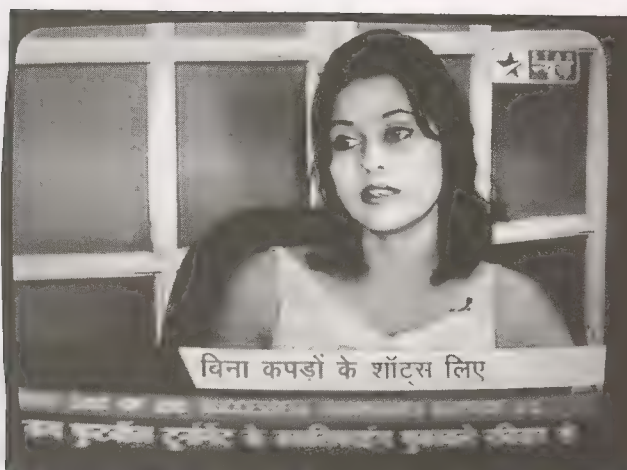
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VIDEO quality, IRD sensitivity is average to above-average. Innovia (left, displaying STAR News India) and SatWork (right, displaying CCTV-9) typically searched-out (located) everything listed in Lyngsat Web Site and in some cases found services not yet posted "on the web."

come into being after the IRD was manufactured. Or, adding a brand new satellite not loaded at the factory, identifying and loading into memory all of the transponders + services found there during a "blind scan."

"Blind" also means that aside from telling the IRD which frequency region to "sweep through" and "search," you as the user do not input *any* other information. Nothing about the likely frequency, or SR (symbol rate) or forward error correction (FEC). This is "pin the tail on the donkey" carried to a new level of electronic sophistication.

#### Bookkeeping

Apparently, from the perspective of the software designer writing the search programme, the most challenging segment is the filing system - how to keep services previously found, and then found again in a later search, from "piling up" creating (for example) CCTV channels in memory when those newly added only duplicate those found in the original "first sweep."

When you restrict your sweep width to a single transponder on a single satellite, "bookkeeping," at least with the Innovia, seems to be spot on. If you have previously loaded and properly tagged CCTV's As3S four-programme-channel bouquet (4129Hz, Sr 13.240, 3/4), and do a "refresher sweep" using the same parameters, the Innovia will come back and tell you nothing has changed. On the other hand, if they had added a new radio channel, it will advise you of this new service and add the parameters to the memory bank. This works provided you begin a blind rescan by going first to the memory originally created for a specific satellite, and having accessed that memory, tell the IRD to scan anew "over the top of" the original scan memory load. When you ask the receiver to do a wideband sweep, covering say all of the vertical (or horizontal) on As3S, or both together using the polarity switching scheme, bookkeeping errors can begin to mount. Remember - each such duplicate/triplicate entry consumes a "memory channel" which means having CCTV with 4 programme channels duplicated once results in 4 less useful-capacity memory channels available to you.

For ease of use, a personal preference, the choice is pretty much a tossup. Anyone who has previously programmed IRDs can do either of these without cracking the (poorly written) manuals. Video and audio quality including ultimate sensitivity is another toss-up; nothing special, nothing bad - they simply

"work." For loading speed, the Satwork is the winner but for bookkeeping accuracy, the Innovia is identifiably better.

#### Short-takes

If all of this bodes well for the ST3618, that would be because you have not "read" Roy Carmen's web-site posting ([www.apsattv.com](http://www.apsattv.com)) review of this receiver. Roy's fine toothed comb finds it *totally* unacceptable.

His "shopping list" of "faults" is long. First, he is angry with the maximum memory bank size of 1,000 transponders/programme channels. That's an easy one to solve; the newer ST3688 has 3,000. Next he finds that while the receiver claims to be able to locate SR (symbol rates) "between 2-45 Mbps" it actually appears to cut off at Sr3700 (3.700). There are not many below 3.700 to check on "out here" but we agree it fails to find Fashion TV (As2, 3795, Sr 2.626). We did however find it by entering under manual-search the parameters including PIDs, suggesting that is not the processor but rather the "Blind Search" software that is at fault.

Next Carmen chastises the bookkeeping. In fact, if you do a blind search on a satellite and then redo it minutes/hours/days/weeks later, the blind search reloads everything found the first time plus anything that has been added in the interim. This is not true with the Innovia which only "adds" to the list the changes or additions - agreeably, a better system. You might live with the duplicates but what it does is: (1) eat up valuable (and limited) memory space, and, (2) create minutes/hours of editing time you would better spend doing something else.

Other Carmen quick-takes. He found the RF modulator did not work. *It does*, but very strangely at 46 MHz (!) or even more strangely, toggling the rear panel switch, at 40 MHz; neither of these are TV-set-tuning frequencies which we would expect a UK reviewer to discover without some test equipment. And he found that if you lock onto a 4:2:2 service, the receiver refuses to move off of that channel, he writes, "until you reboot the receiver." We found 4:2:2 and had no trouble getting it to move on without rebooting so perhaps the European 4:2:2 is different than the Asia (As2) version. He also describes the front panel plastic cover as *clear* when "clearly" it is "smoked," in a burnt amber. We point this out on the off-chance that there may be two or more "different" versions of the 3618 "out there" and if the front panel colour



changes, why not also some of the internal operating parameters as well? And he found no reason for the receiver to have "built in software games" - right on. If you want games, go to [www.cartoonnetwork.com.au](http://www.cartoonnetwork.com.au).

One word of caution. Many satellites, such as PAS-2, have a sizeable number of "feed" or "occasional use" transponders; only "lit-up" for a few hours per day or week as demands require. Industry reference site [Lyngsat.com](http://Lyngsat.com), for example, lists 17 "feed" SCPC channels on PAS-2 vertical. At any given moment, you could find one or two of these in use. Over a period of a month, if you rescanned frequently, you might catch as many as 6 - 8 "active." Additionally, the number you actually load will also be a measure of the quality of your dish + LNB + feed system - for most satellites a 2.4m dish will locate more of those listed on Lyngsat than say a 1.6m but fewer than a 3m. Not all SCPC or MCPC are at the same power level and the smaller the dish system, the smaller the number of services you will locate and load.

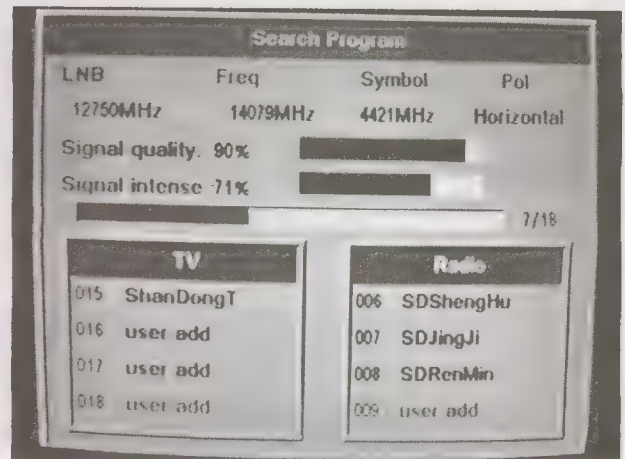
Additionally, a dish with a non-optimum feed or LNB will load fewer than other dishes of the same size with a properly performing LNB+feed+dish. In a sense, how many you load is a test of your own system's sensitivity (threshold). "Feed channels," as listed on Lyngsat (and elsewhere), are at best indicators of past activity, perhaps wrapped around a specific event (such as the APEC meeting). Domestic satellites (Optus C1, B3) make regular almost-scheduled use of feed channels; the international satellites do not.

#### Sources?

Blind search receivers have perhaps received a "bum rap" because of two factors: People expect them to do things not possible with today's software technology, and, self-appointed experts desirous of having "the perfect receiver" have been vociferous and loud when a new offering has entered the market at a functional "level" lower than *they* demand.

This is a new technology. It will get better. Soon. In a year, we predict, any receiver without it will be "second rate."

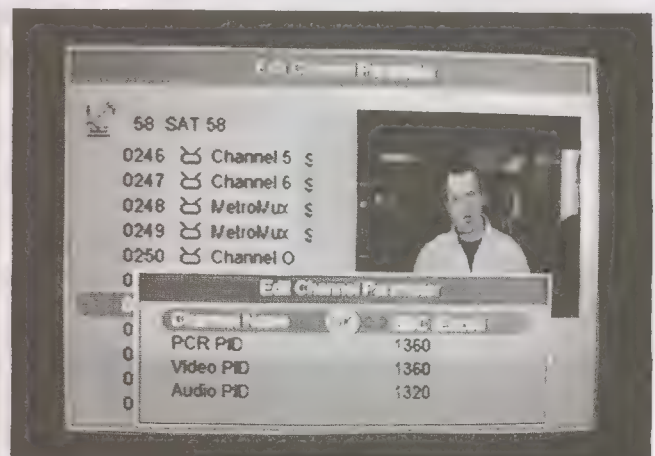
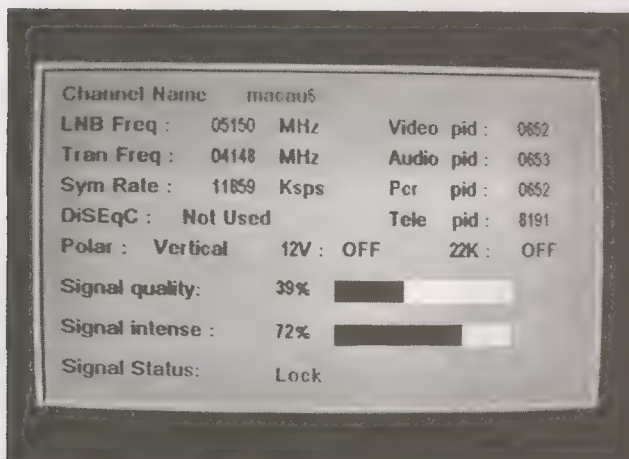
Satwork? The Satwork ST3618, which we review here, now has a bigger-better "brother" - the ST 3688 which ups the memory bank from 1,000 to 3,000 and adds DiSEqC 1.2 amongst other new features. Neither the 3618 or 3688 are presently available directly through Pacific distributors. Contact [tim@dmsiusa.com](mailto:tim@dmsiusa.com) (tel ++1-770-529-6800). Likewise the Innovia is also not yet available through a Pacific distributor but [www.apssattv.com](http://www.apssattv.com)'s Craig Sutton is on the case trying to raise interest in handling a first class receiver here.



SOMETHING Carmen missed - if you mis-enter the LNB and/or search frequency range into the 3618, and then punch up "OK" (telling it to begin blind scan), it will in fact locate everything operating on that particular satellite (or polarity of a satellite) but in doing so it creates "found-frequency" numbers which are totally fictitious (see above - when did you last see a satellite downlinking at 14.079 GHz!). How is that possible? The LNB input feed (950 - 1450 MHz) is "there" and when the blind search begins, the processor does a mathematical calculation starting with the erroneous numbers you punched in (12.750 LO) and returns search results based upon the numbers punched in - not the actual numbers themselves. Bottom line? The "machine" is no more "perfect" than the person operating it; "garbage-in equals garbage out." The 3618 should never have "OK" punched up until you have rechecked all entries - it likes to "go" even when improperly set-up!

To complete the circle, there are two other blind search versions out there. The original Coship 3188C (currently only available through Satlink NZ [[www.satlinknz.co.nz](http://www.satlinknz.co.nz)]) and the Powtek which was initially imported by Jason Racic ([www.adigitallike.com](http://www.adigitallike.com)) into Australia. Racic assures SatFACTS his Powtek model is not related to either Coship or Innovia suggesting the blind search technology may be more broadly based than we initially believed.

INDIVIDUAL channel parameters "on-call" with ST3618 ("red button") /3688 (info).

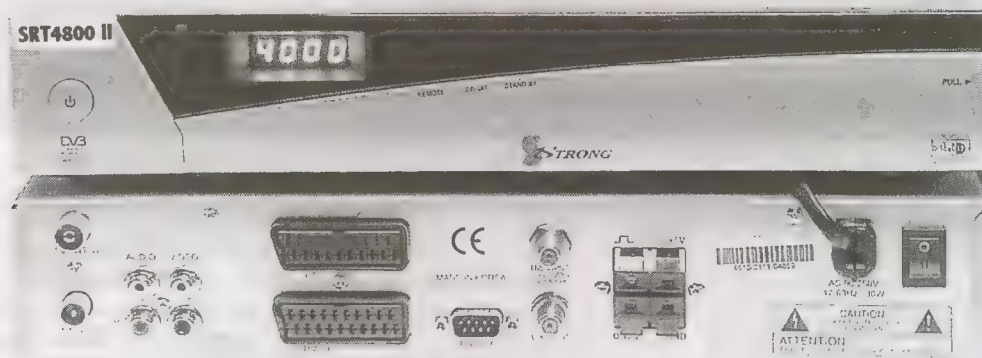




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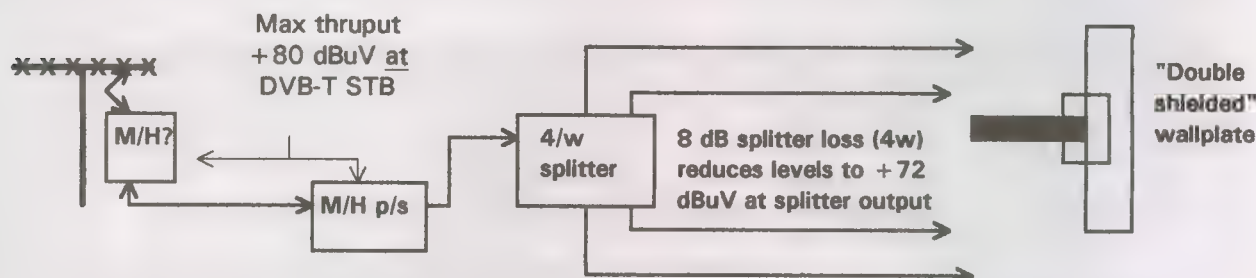
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## Selecting Amplifier and Passive Hardware for your next multiple-outlet installation



One of the first decisions an installer must make when planning a DVB-STB (digital terrestrial) installation is whether he will use amplification in the system. In analogue reception, it is difficult (although not impossible; see diagram, below) to have "too much" signal to an individual TV set connected to a "master antenna." In a DVB-T installation, the "set-top-box" (STB) interfaces between the antenna "system" and the TV receiver, and it has a rather narrow "input signal level window" which must be respected.

Measuring DVB-T signal levels requires a special meter (such as the DaTuM 10 from Laceys.tv) - *nothing* in your ancient analogue "kit-bag" will do this job. When the terrestrial digital signal is too strong, several undesirable things occur within the STB. First of all, DVB-T often is transmitted using a channel that is frequency-adjacent to a pre-existing analogue service (such as 7-D being on 8 with 7-analogue being on 7). When you "stack up" 7-A to 7/8D, 9A to 9/9A-D, 10A/11D and finally 2-A to 12D, you suddenly have not four band I and III signals but rather 8 total. In *any* amplifier, when you double the number of carrier signals "through" an amplifier device, the output of the amplifier must be backed off (reduced) by at least 50% (3 dB) to avoid driving the amplifier into premature overload (failure). The amplifier, whether a masthead or a distribution-class device, cares not whether the signals passing "through" are analogue or digital - both classes are power consumptive carriers regardless of their format.

The answer is - reduce the total output power by turning down the gain of the amplifier. And if you don't? Potentially, cross-modulation - this is what happens when an amplifier

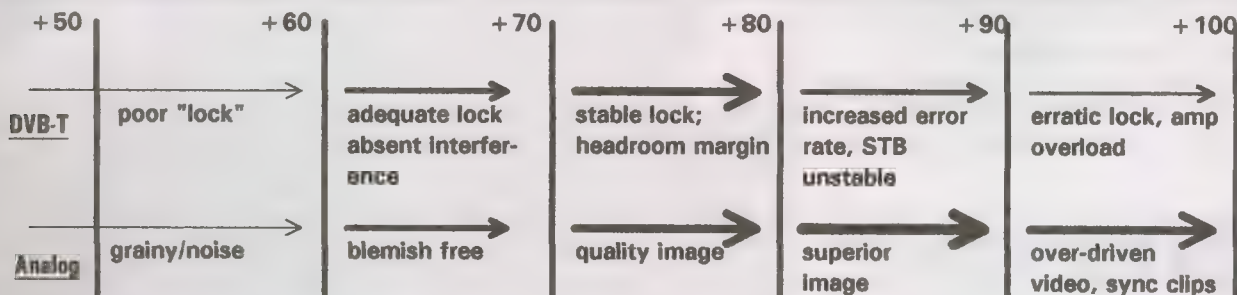
stage is driven (operated) beyond its design limits and one (or more) of the input signals begins transferring "modulation artefacts" from one pass-through carrier to another. Such as 9A being amplifier-demodulated and then super imposed on 7/8D, within the amplifier stage.

Any amplifier can suffer "overload" and once overloaded, whether by a digital terrestrial or analogue terrestrial signal, resolving the challenge can be very difficult to sort out. The one test worth trying is to reduce the total amplifier gain using the inside-of-amplifier "gain control." If turning the gain down reduces or eliminates the reception difficulty, you have just proven "amplifier overload."

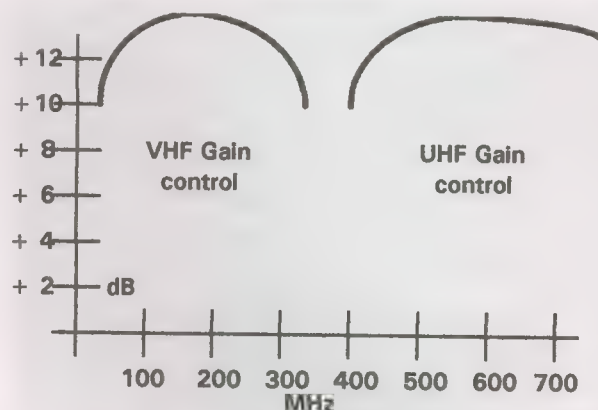
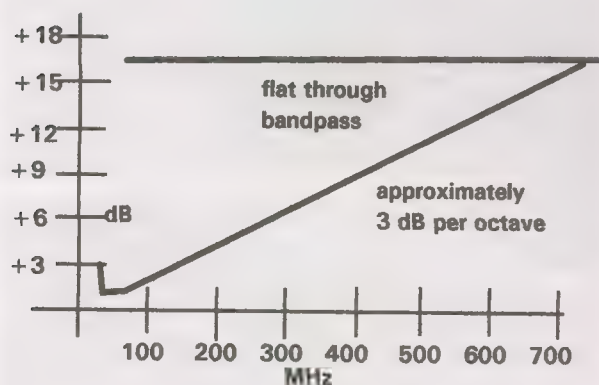
Digital terrestrial are sitting ducks for analogue-terrestrial cross-modulation because typically they are transmitted -10 dB (10 dB weaker in carrier level) than their analogue counterparts. In theory, 30 kilowatts of DVB-T transmission is the equal to 300 kilowatts of analogue-terrestrial in the field; coverage ability. So today, while analogue *plus* digital are on the air, we have analogue 7 +10 dB stronger at the receiving location than 7D/8. When you measure a DVB-T carrier with a suitable instrument, the unmeasured analogue(s) are +10 dB (or more) at the same time. *Overload* time.

### Do you really need an amplifier?

A home/location with one DVB-T STB and one or more standard analogue receivers can be a challenge. The DVB-T levels must be kept down, even when no amplifier is required, to around +80 dBuV (maximum) at the input to the STB. The DVB-T "acceptance window" is relatively narrow - field experience suggests +70 to +80 dBuV is safe and anything







TWO design approaches to broadband/VHF-UHF (house) distribution amplifiers. Left, an "equaliser" adjustment sets the gain as a function of frequency - more gain at higher frequencies - to compensate for the natural "greater cable loss at higher frequencies" effect of RG6 and other standard cables. On right, when the amplifier is likely to be used only for VHF + UHF off-air reception, two independent (separate) gain controls are provided. VHF "gain" typically covers 40-250/300 MHz while UHF gain (a separate control) covers from around 450 - 800(+) MHz. In between the two, a "hole" (such as 250/300-450 MHz) with reduced or "out of phase" gain. Selecting the correct amplifier is important!

below +65 or above +85 can cause STB problems (not all STBs are created equal - some have a "thinner" signal acceptance "window" than others; be brand and model conscious!). Fortunately, setting aside amplifier overload as a cross-modulation challenge, the analogue signals processed by the same system are less apt to cause problems if they "hit" the analogue TV sets at +90-95 dBuV. Which means? When you get to the TV set input terminal in the region of +80 dBuV on the digital channels, the analogue adjacent channels will be (or should be!) around 10 dB stronger than the digitals anyhow - simply because 300 kilowatts (analogue) is 10 dB more powerful than 30 kilowatts (digital).

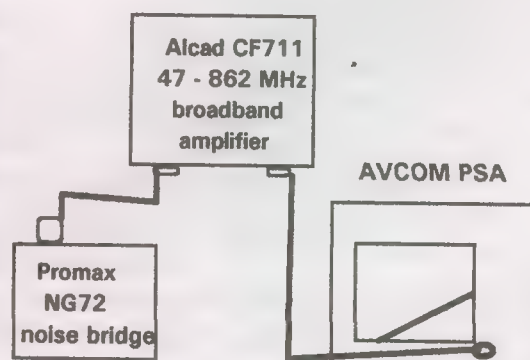
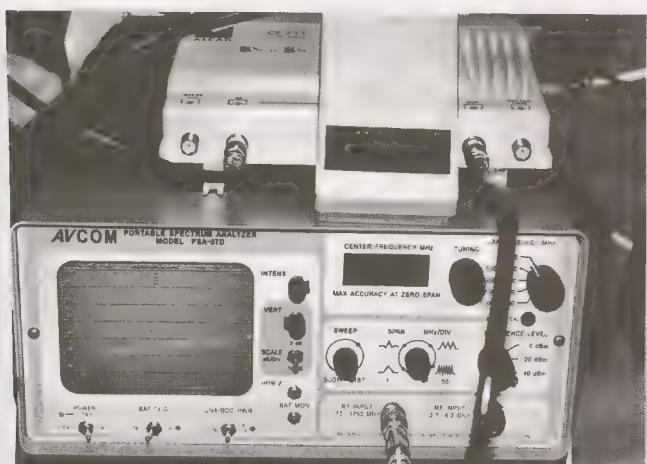
Selection of an amplifier, when and where required, is an important step in designing a system. First, the amplifier must cover the frequency spectrum involved in the distribution system. The Laceys.tv AL221, for example, covers 47 - 862 MHz but it does so in two separate amplifier-gain settable ranges (see above diagram, right). The VHF range covers

bands I, (II) and III while the UHF range begins near 400 MHz and extends to nearly 900 MHz. With "individual" gain control ranges of approximately 10 dB, each "range" can be adjusted to suit the particular installation circumstances.

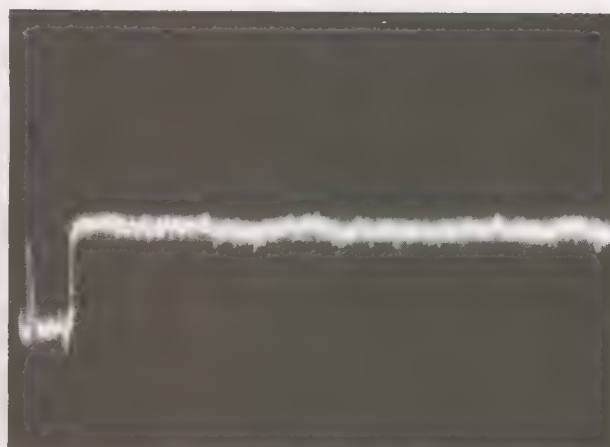
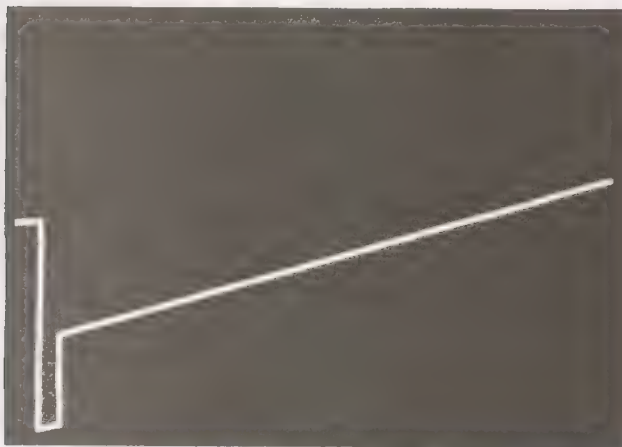
The data sheet reveals that at 105 dBuV the "cross mod" (IMD3 at -60 dB) will be 60 dB below the peak carrier level through the amplifier. Interpretation? If the strongest (VHF or UHF) signal passing through the output is +105 dBuV, the inter-modulation-distortion (IMD3) will be -60 dB (below) the 105 dBuV carrier level; or,  $105 - (\text{minus}) 60 = 45 \text{ dBuV}$ . Is that good?

Adequate but marginal when it come to creating modulation interference to the less powerful signals passing through the amplifier. "Modulation interference" is cross modulation - the sync pulses of the strongest TV carrier superimpose themselves on the weaker carriers passing through the amplifier. There is a danger zone here - when an amplifier

PROPER analysis of amplifier bandpass characteristics requires a frequency-identifiable "sweep." Here, a Promax NG72 broadband noise bridge is fed to an Alcad CF711 amplifier and the detected response is displayed in a frequency-spectrum that covers 40 - 900 MHz. The (as adjusted) amplifier "tilt" is apparent in the display on the screen; covering 47 (left side) - 862 MHz (right side) over a 18 dB range.







NOISE bridge as "signal source" run through Alcad CF711 (Laceys.tv source) high gain, broadband amplifier with tilt adjusted for approximately 3 dB per (frequency) octave - left, and "flat" (right); 47 - 862 MHz left to right.

"overloads" it is no longer a "linear device."

**Linear?** There are several forms of amplification - if you wish the output of the amplifier to be a replica (same modulation and frequency characteristics) as the input, "linear" is the way to go. "Linear" means nothing is changed but the amplitude (strength) of the signal(s) being amplified. However, an amplifier (whether a single stage of gain or multiple stages of gain) can be "forced" into a non-linear state (mode of operation) by changing the various voltages which it consumes. If the input signal, from the antenna or a preceding stage of gain, rises past the point of linear operation, the stage (transistor gain device) goes non-linear and it becomes (amongst other things) a "detector."

So now, with too much input, it is not only no longer "linear" but it is also acting like a "receiver" separating some forms of the too-strong signal(s) modulation and using them to "modulate" one or more of the lesser strong signals also passing through the overloaded amplifier stage.

The "synchronisation" pulses of an analogue TV carrier are the typically the strongest portions of the TV carrier. The overdriven no-longer-linear amplifier stage grabs onto the synch pulses in its misguided role as a "detector" and transfers these pulses to the less strong carriers.

Net result? The 10 dB weaker DVB-T signals, being the most susceptible to interference, end up with analogue "synch pulses" superimposed on top of the COFDM format digital signal(s). If there is one thing COFDM signals cannot tolerate, it is analogue synch pulses intermixed with the spread-spectrum digital signal at a level which is equal to (or greater than) the COFDM information.

How do you know you have this problem?

If you are using a DVB-T meter (such as Laceys.tv DaTuM model 10) in the "Signal level" and "Carrier to Noise Ratios" settings, the DVB-T signal may *seem* within normal limits for proper decoding. Yet it is not decoding, or, is decoding in an erratic fashion. Why?

Switch to "Bit Error Rate Estimation" and recheck. It should show a BER which is below digital lock, a side effect of having those analogue synch pulses intermixed with the COFDM signal.

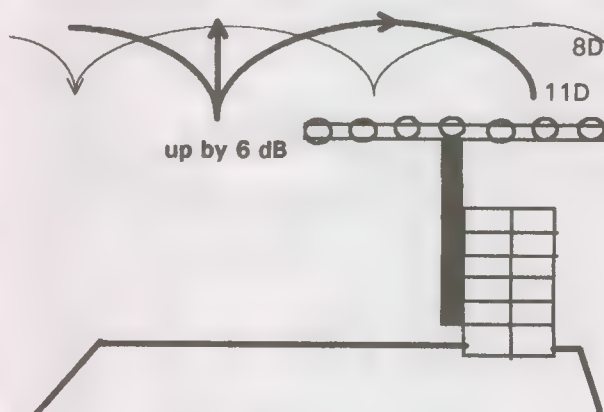
With each make and model of DVB-T set top box, you will quickly learn what the signal level, carrier to noise and BER

readings should be for proper decoding of the DVB-T signals. There are some additional "caveats" (warnings).

It is the nature of VHF and UHF wave *propagation* (the act of travelling from the transmitter to your receiving site) that minor differences in the transmission path will cause some signals originating from the same or near-same transmitter site to be significantly different in (1) signal level, (2) interference susceptibility. Just because 8D is good at your receive site does not mean that 9A/D or 11D will be acceptable at the identical receive antenna installation location.

Transmission wavelengths in the 200 MHz region are measured in the region of 140cm. That means the "free space standing waves" (peaks and valleys in the received signal strength) are going to be in a rolling fashion around 50 inches apart. In a particular receive antenna installation location, 8D may well be at the "crest" of a free space standing wave while 11D is in a valley (see diagram, below) for a specific "fixed" antenna location. In a purely LOS (line of sight) receiving situation, the only difference in the "standing waves" as they are intercepted by the receiving antenna will be attributed to the different transmission path lengths; the transmitting antenna(s) to the receiving antenna. But a pure LOS path is

ILLUSTRATED: At "fixed" receive antenna location, 8/11D "free space" *standing waves* are 6 dB peak to crest if the paths are LOS - line of sight.





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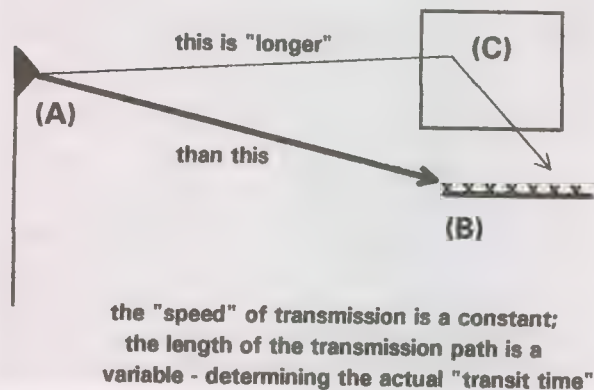
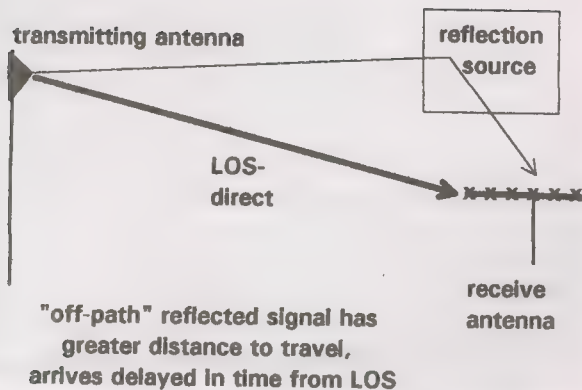
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almost never the case- even if the receive site is in fact line of sight to the transmitting antenna(s). The "culprit" will be the "off-path" non-direct path wavefronts which graze buildings, hills, and reflect (or refract) from these surfaces to the side, down or up and arrive at the receiving location slightly delayed in time from the LOS signal.

#### *Why delayed in time?*

The shortest path between two points is "direct." Any path that involves a reflection (refraction) covers more "ground" and as transmission delivery time is a function of distance travelled, it follows that a longer path takes more time to "traverse" than a shorter (direct) path. At the speed of light (which is the approximate speed of TV signals), the difference in time between "A" to "B" or A-C-B is measured in microseconds. But in one complete second the terrestrial TV image has been transmitted from "A" to "B" 25 complete times (PAL format at 25 frames per second). If a particular image takes 1/25th of a second longer to go from A to C to B then it does to go from A to B, and the image content changes every 1/25th of a second, the A-C-B image has different "content" than the A to B direct path image. In effect, we then have two dissimilar sets of TV information occupying the same frequency bandwidth simultaneously. They may have started the trip at the same time, but one is taking longer to arrive than the other and in that split-second of delay, the TV set's signal processing circuits become very confused about having two non-identical sets of data to process.

When two (or more) "different-time-in-transit" analogue signals arrive at the receiver, the first (shortest path-LOS) signal "paints" on the screen. Immediately behind it, delayed or offset by time, the second signal follows the first. Now we have two images on the screen - basically identical in content only the delayed signal is offset on the screen to the right from the direct path signal. The delayed image is called a "ghost" in the trade. If the ghost path length is very close to (but still longer-than) the LOS signal, the picture on the screen "smears" slightly - noticeable on lettering appearing on the screen. The "smear" causes the original sharp letter edges to "blend" towards the right hand screen edge. Actually, all portions of the image (not merely the lettering) "smear" equally but in a moving image it is more difficult to identify the "extra image content."

The amount or "depth" of the smearing is a function of several factors:

1/ The ratio of signal level arriving at the receiver from both the LOS path and the reflected path. If, for example, the LOS

path is strong and the indirect path is 20+ dB weaker in level, the smearing is barely noticeable.

2/ The amount of time delay between the two signals. The greater the time differential, the further "to the right" the late arriving image appears. If it appears far enough to the right, the on-screen image can actually be two separate, distinct pictures.

If the time delay is great and the reflected path signal is as strong as the shorter-LOS path, it is possible for an analogue signal to do as total image reversal; portions of the original signal that began life as "black" turn "white" and the reverse; a negative "appearing" image.

In the real world, not many LOS reception sites have only a direct signal present. LOS means the receiving site is reasonably close to the transmitter, and the nearer to the transmitter source the site, the greater the amount of transmitter radiated energy bouncing off of hills, trees, buildings and even flat ground (or water) in between the two locations. As you go further from the actual transmitter site, signal levels decline which is a blessing in disguise - the reflected signals that are present are attenuating as well.

#### COFDM

One of the most appealing benefits of digital terrestrial is the very high tolerance the frequency division multiplex (FDM) format exhibits for dealing with reflections. The system is not totally immune to reflections but on a scale of 1 to 10 where analogue is a number-10-susceptible, COFDM is a 2. Therefore receiving locations in close to analogue transmitters where reflections make images smeared and reception poor can be brought into the 21st century by simply switching them to DVB-T.

Unfortunately, COFDM is not totally immune to other forms of interference; broadband "pulses" being troublesome. When someone starts a petrol powered lawnmower or other yard "toy" close to the DVB-T receiving antennas, a wide range of "ignition noise" pulses radiates into the air. These jagged noise signals confuse the forward error correction (FEC) portion of COFDM system - it is unable to distinguish between unwanted noise pulses and FDM signal pulses; loss of lock.

Which brings us back to the beginning. An in-house amplifier, "overdriven" by one or more too-strong analogue signals, turns into a "detector" and creates broadband synch pulses that totally confuse the FEC portion of the COFDM set top box. The solution, as we now see, is to reduce the gain of the amplifier, and regain "linear-state" operation.



# SatFACTS Pacific/Asian MPEG-2 Digital Watch: 15 November 2003

Bird	Service	RF/IF &Polarity	# Program Channels	FEC	Msym
Thom3/78.5	SkyChAust	3695/1455H	up to 3	3/4	5(,000)
	Indivision	3685/1465H	1	3/4	6(,830)
	MRTV-Myn	3676/1474H	1	2/3	6(,000)
	Korean Central	3665/1485H	1	2/3	3(,367)
	TARBS ME mux	3640/1510H	12TV, 12 radio	2/3	28(,066)
	Ch Nepal	3626/1524V	1	3/4	15(,556)
	Mahar mux	3600/1550H	11TV, 1 rad	3/4	26(,667)
	SE Asia Mux	3569/1581H	2+ TV	3/4	12(,500)
	RR Sat mux	3551/1600H	8TV, 10 radio	3/4	13(,333)
	JAIN TV	3538/1612V	1TV	3/4	3(,300)
InSat 2E/R3	PTV1 +	3521/1629V	1TV, 1 radio	3/4	3(,333)
	TARBS	3520/1630H	12TV, 12 radio	3/4	28(,066)
	TVK Cambodia	3448/1702H	1TV	1/2	6(,312)
	TARBS/Th5	3480/1670H	12 TV+radio	2/3	26(,667)
	KCTV/Korea	3424/1726H	1TV	3/4	3(,366)
	Thai Global	3425/1725V	up to 7?	2/3	27(,500)
	RTV mux	4005/1145V	6+ TV	3/4	27(,000)
	Hyd Dig 2E	3910/1240V	1	3/4	5(,000)
	Kairali TV	3699/1451V	1	3/4	3(,184)
	Indian mux	3643/1507V	3	3/4	19(,531)
NSS6/95E	ETV Mux#2	3485/1665V	4+TV	3/4	27(,000)
	Sky Bangla	3430/1720V	1TV	3/4	6(,000)
	New MUX	12 729V	3+ TV	7/8	27(,500)
	Test MUX	12.688V	?+ TV	3/4	28(,066)
	Test MUX	11.592H	?+ TV	7/8	26(,000)
	Shandong TV	4070/1080H	1TV	3/4	6(,811)
	Euro Bougt	4000/1150H	6TV, 21r	3/4	28(,125)
	Sichuan TV	3946/1204H	1TV + radio	3/4	4(,420)
	Reuters News	3905/1245H	1TV	3/4	4(,000)
	WorldNet	3880/1270H	4+/28radio	1/2	20(,400)
As2/100.5E	Hubei/HBT	3854/1296H	1	3/4	4(,418)
	Hunan/SRT	3847/1303H	1	3/4	4(,418)
	Guan/GDT	3840/1310H	1	3/4	4(,418)
	In. Mongolia	3828/1322H	2	3/4	8(,397)
	APTN Asia	3799/1351H	1	3/4	5(,632)
	Reuters/Sing	3775/1375H	1	3/4	5(,631)
	Liaonin/Svc2	3734/1416H	1	3/4	4(,418)
	Jiang/JXT	3727/1423H	1	3/4	4(,418)
	Fujian/SET	3720/1430H	1	3/4	4(,418)
	Qinghai/TV	3713/1437H	1	3/4	4(,418)
As2/100.5E	Henan/Main	3706/1444H	1	3/4	4(,418)
	Egypt/Nilesat	3640/1510H	7+, radio	3/4	27(,850)
	Macau MUX	4148/1002V	5TV	3/4	11(,850)
	Feeds	4086/1064V	1	3/4	5(,632)
	Dubai MUX	4020/11430V	4+, radio	3/4	27(,500)
	Jilin Sat TV	3875/1275V	1	3/4	4(,418)
	Shanghai BN	3846/1304V	1	3/4	4(,800)
	HeiLong/Jian	3834/1316V	1	3/4	4(,418)
	JSTV	3827/1323V	1	3/4	4(,418)
	Anhui TV	3820/1330V	1	3/4	4(,418)
As3S/105.5E	Shaanxi/QQ	3813/1337V	1	3/4	4(,418)
	Guan/GXTV	3806/1344V	1	3/4	4(,418)
	Fashion TV	3795/1355V	1	3/4	2(,626)
	3-ch miniMUX	3752/1398V	up to 3	3/4	5(,640)
	Saudi TV1	3660/1490V	7+/tests	3/4	27(,500)
	Telstra 1-Net	12.596V	no TV	5/6	30(,000)
	Zee bouquet	3700/1450V	10TV	3/4	27(,500)
	Ch News Asia	3706/1444H	1TV (+)	3/4	6(,000)
	Ariang TV	3755/1395V	1	7/8	4(,418)
	Now TV +	3760/1390H	up to 8TV	7/8	26(,000)
Cak1/107.5	Star TV	3780/1370V	7(+)+TV	3/4	28(,100)
	Star TV	3840/1310H	7(+)+TV	7/8	26(,850)
	Star TV	3860/1290V	5(+)+TV	3/4	27(,500)
	Star TV	3880/1270H	20(+)+TV	7/8	26(,850)
	Star TV	3920/1230H	4+ TV	7/8	26(,850)
	Star TV	3940/1210V	6(+)+TV	7/8	26(,850)
	CNNI	3960/1190H	8(+)+TV	3/4	27(,500)
	Star TV	3980/1170V	6+TV	3/4	28(,100)
	Star TV	4000/1150H	8(+)+TV	7/8	26(,850)
	Sahara digital	4020/1130V	8TV	3/4	27(,250)
T'Kom/108E	Pakistan TV	4090/1060V	1+TV, radio	3/4	6(,666)
	Sun TV	4095/1055H	1	3/4	5(,554)
	T'VB Mux	4010/1040H	3	3/4	11(,230)
	CCTV bqt	4129/1021H	4(+)+TV	3/4	13(,240)
	Zee Bqt #2	4140/1010V	8(+)+TV	3/4	27(,500)
	Indovision (S-band)	2.535, 2.565, 2.595, 2.625, 2.655	33(+)+TV	7/8	20(,000)
	IndoBqt	3460/1690H	up to 6	3/4	28(,000)
	TPI	4185/965V	1	3/4	6(,700)
	TVE Asia-Africa	4160/990H	1	3/4	5(,632)
	Anteve	4144/1006V	1	3/4	6(,510)
C2M/113E	Indo Mux	4080/1070H	5+ TV	7/8	28(,125)
	Indostar	4074/1076V	1	3/4	6(,500)
	SCTV	4048/1102V	1	3/4	6(,618)
	Indonesian Mux	4000/1250H	6+ TV	3/4	26(,085)
	Satelindo	3935/1215H	1	3/4	6(,700)
	Bali TV	3926/1224H	1	3/4	4(,208)
	Indo MUX	3880/1270H	3+ TV	7/8	28(,121)

## Receivers and Errata

CA (#1, 3); FTA audio #2 (dm)
Tests June 2003; not permanent
erratic service
Global footprint; changes 02/03
CA + 2 FTA(A1TV, IRB3)(DM)
New 03/03; FTA
Thai + Indian services, FTA (DM)
MRTV3, MRTV (DM)
3TV, Sradio currently in use (DM)
PIDs 4132/4133
frequency change
Feeds to TARBS Australia and PAS-8 (DM)
FTA
3FTA: TV5, VTV4, ATN Bangla (DM)
Not 24 hour
FTA (reaches SE Australia)
Several RTV now here; wide beam
SCPC, OK E. Aust. wide beam
SCPC, OK E. Aust wide beam
corrections 12/02
Several new ETV here; Asia beam
New - November 2002
Close to horizon, LNBf skews towards Hzl
PowerVu; may be NE Asia beam; tests
TARBS was testing here - uplifted from Thaicom
New - October 2002
FTA TV + radio
New April 2003
Was 3923H, sometimes FTA
FTA, multiple audio services
FTA SCPC, teletext, 2 radio
FTA SCPC, teletext
FTA SCPC, radio APID 81
FTA #1 Mongolian, #2 Mandarrn
Sometimes FTA; also 3895Vt
FTA & CA
FTA SCPC, radio APID 256
FTA SCPC, teletext, radio APID 81
FTA SCPC, + radio APID 80
FTA SCPC, + 2radio (APID 80)
FTA SCPC, + radio
Thru TARBS Aust, occ. FTA
5 chs TV, FTA, some tests
FTA SCPC feeds
FTA, sometimes includes sport
FTA SCPC, + radio
V1110, A1211 + 2 radio, FTA Jan 2003
FTA SCPC
FTA SCPC, + radio
FTA SCPC + radio
FTA SCPC, radio APID 81
FTA SCPC, radio APID 257
FTA as of May 1, 2003
Sun-TV, Surya TV, KTV (FTA)
FTA MCPC, Yemen, MBC EUROsport tests
Signal useful for dish testing - no TV
Mediaguard + Comax CA, 2 occ FTA
New September 2003; English + V1160, A1120
FTA SCPC; New PIDs V3601, A3606 June 2003
CA + NOW, Bberg, Indus Music, MTA FTA
NDS CA (Pace DVS211, Zenith)
NDS CA (Pace DVS211, Zenith)
NDS CA (Pace DV211, Zenith) In transition 06-2003
Star Sports Asia (+), FTA NJSC, V512, A640 English
NDS CA as above; may NOT be operational
PowVu CA; new SR Apr 29
NDS CA; Star News India FTA VPID 514, APID 648
NDS CA w/ 4(Chinese) FTA
New Sr September
New to digital June 2003; V308, A256
"History Channel" testing SCPC
MAITV Chinese movies FTA; + CA
moved from 4115
Mediaguard (SECA) CA
NDS CA using RCA/Thomson,
Pace IRDs; 2.535 has 2 FTA
also 3586H/17.500, 3496H/19.615
FTA SCPC; NT/NC only
New August 2003
change from 4055V; FTA SCPC
Global TV - erratic new FEC 06/03
FTA (new 06-03); V2201, A2202
FTA SCPC, NT, New Caledonia only
undatable platform - not always there
test card - only - reported
FTA, may not be active full time
FTA; Sr change 01/03; erratic



Bird	Service	RF/IF & Polarity	# Program Channels	FEC	Msym
	GlobalMUX	3760/1390H	up to 11 TV?	7/8	28(121)
	Brunei/Sing	3733/1417H	1TV	3/4	6(000)
	TBN/Trinity	3727/1423H	1 TV	3/4	3(000)
	RCTI	3473/1677H	2	3/4	8(000)
	Myawady TV	3706/1444H	1	3/4	5(924)
As4/122F	Speedcast data	4120/1030H	0 - data only	3/4	27(500)
Jc3/128	Miracle Net	3996/1154V	3 up to 6	5/6	22(000)
	Asian bqt	3960/1190V	up to 8	7/8	30(000)
Jc2A 154	Cnet	3880/1270V	up to 12	3/4	30(000)
	BYU tests	3.915/1245V	2	3/4	3(703)
Meas2	New Mux	12.532H	17	3/4	41(500)
	Astro Mux	11.602H	up to 17TV	3/4	41(500)
	VTM MUX	11.522V	3 TV	3/4	9(766)
B3/152	RTV tests	12.407V	6+ TV	2/3	30(000)
	GlobeCast tests	12.525V	8+ TV, radio	2/3	30(000)
	Aurora tests	12.637V	5+ TV	2/3	30(000)
C1/156	GlobeCast	12.367V/T2	13TV, 12radio	2/3	30(000)
	Aurora	12.407V/T3	13TV, 12radio	2/3	30(000)
	Aurora	12.527V/T6	11TV, 19radio	3/4	30(000)
	Aurora	12.567V/T7	2+ radio (only)	2/3	30(000)
	(tests)	12.606V/T8	TVSN FTA	3/4	27(800)
	Aurora	12.720V/T10	10TV, 19radio	3/4	30(000)
	Austar	12.278H/T11	31 data (some TV)	3/4	30(000)
	Optus/Foxtel	12.358H/T12	11TV	3/4	27(800)
	Optus/Foxtel	12.398H/T13	10 TV	3/4	27(800)
	Austar/Foxtel	12.438H/T14	12TV	3/4	29(473)
	Optus/Foxtel	12.478H/T15	9 TV	3/4	27(800)
	Austar/Foxtel	12.518H/T16	11TV, 8 fill, 1 radio	3/4	29(473)
	Austar/Foxtel	12.558H/T17	11TV, 124 radio	3/4	29(800)
	Austar/Foxtel	12.598H/T18	11TV	3/4	27(800)
	Optus/Foxtel	12.638H/T19	8TV, 24 radio	3/4	27(800)
	Austar/Foxtel	12.688H/T20	12TV	3/4	29(473)
B1/160	ABC NT fd	12.258V	1TV, 3 radio	3/4	5(026)
	Occ. feeds	12.380H	1 TV - *	3/4	6(111)
	Occ. feeds	12.384V	1 TV - *	3/4	6(111)
	Net 7 service	12.397H	1	3/4	7(200)
	Central 7	12.354H	1TV + 1 radio	3/4	3(688) (*)
	Imparja mx	12.379H	2TV + 8 radio	3/4	5(424)
	7 digital feeds	12.397H	1TV	3/4	7(200)
	Feeds to NZ	12.411V	1 TV	3/4	6(111)
	Sport feeds	12.420V	1	3/4	6(110)
	SBS Mux	12.420H	3+ TV, 2+ radio	5/6	12(600)
	TVNZ DTH	12.456V	5+TV	3/4	22(500)
	Nine Net	12.512H	1 TV typ.	3/4	5(632)
	Sky NZ	12.519/546V	7TV/7TV	3/4	22(500)
	Sky NZ	12.581/608V	61V/61V	3/4	22(500)
	Sky NZ	12.644/671V	9TV	3/4	22(500)
	ABC HDTV	12.603H	5TV	7/8	14(300)
	Sky NZ	12.707/733V	8+TV	3/4	22(500)
	Mix 106.3	12.574H	1 radio + data	3/4	1(851)
P8/186	TARBS3	12.326H	13TV + radio	3/4	28(066)
	TARBS	12.526H	13TV + radio	3/4	28(066)
	TARBS2	12.606H	13TV + radio	3/4	28(066)
	1ARBS5	12.646H	testing	3/4	28(066)
	TARBS4	12.726H	13TV + radio	3/4	28(066)
	JEDI/TVB	12.686H	11+ TV	3/4	28(126)
	ABC A-P	4180/970H	2TV, 2 radio	3/4	27(500)
	Disney Pac	4140/1010H	typ 6 TV	5/6	28(125)
	NHK Joho	4060/1090H	7TV, 1 radio	3/4	26(470)
	FOX Mux	4040/1110V	up to 5TV	7/8	26(470)
	NET +	4121/1029V	1 TV	3/4	4(774)
	ESPN USA	4020/1130H	8+TV, data	3/4	26(470)
	Discovery	3980/1170H	8 typ.	3/4	27(690)
	CalBqt/Pas8	3940/1210H	up to 3+ FTA	7/8	27(690)
	CNBC HK	3900/1250H	up to 7TV	3/4	27(500)
	FilipinoMUX	3880/1270V	up to 8TV+radio	5/6	28(694)
	TaiwanBqt	3860/1290H	12TV + 30 r	5/6	28(000)
	CCTV Mux	3829/1321H	up to 4	3/4	13(240)
	TVBS-N	3836/1314V	1FTA, 4+ CA	3/4	22(000)
	EMTV PNG	3808/1342V	1 + 2 radio	3/4	5(632)
	CNNI	3780/1370H	3, up to 5 TV	3/4	25(000)
	Discovery Asia	3764/1386V	Up to 6 TV	3/4	19(850)
	MTV	3740/1410H	8	2/3	27(500)
	ABS-CBN APTN	3712/1438V	1	3/4	3(712)
P2/169E	Off-shore rigs	12.281V	2+ TV, radio	2/3	27(500)
	WA PowVu	12.637(5)V	4TV, 8 radio	1/2	18(500)
	NBN-TV	4126/1024V	1TV	3/4	3(075)
	TARBS	4090V/1060V	9TV + radio	3/4	21(000)
	Feeds	4037/1113H	1+ TV	2/3	6(620)
	Feeds	4027/1123H	1+TV	2/3	6(620)
	Feeds	4023/1127V	1+TV	3/4	13(328)
	Feeds	3966/1184V	1	2/3	6(620)
	Feeds	3957/1193V	1	2/3	6(620)
	Feeds	3929/1221V	1	3/4	10(850)
	Feeds	3912/1238V	1	2/3	6(620)
	Feeds	3898/1252V	1	2/3	12(000)
	Middle East	3836/1314V	4 typ	3/4	13(331)
	Feeds	3803/1347V	1	3/4	6(000)
	PAS/BBC mux	3744/1406V	3	3/4	21(500)

## Receivers and Errata

test cards (11), new Sr/FEC 01-03  
 FTA share time; Brunei 23 hrs, Sing 1 hr  
 New PIDs 10-03; reload  
 FTA SCPC; Australia, New Caledonia, some English  
 Tests; may be erratic if even operating  
 3 data chs, useful for dish tracking  
 PowerVu; some FTA (Ch. 1 & 3)  
 CA & FTA NTSC: Japan, Taiwan  
 Cnet (Taiwan) tests; not full time  
 Erratic service; very strong NZ and Australia  
 New Sept 2002; unknown source  
 Aust East beam - 3 FTA + 14 CA  
 WA only? Skew path, intended Asia  
 now differs from 12.407 C1  
 C1 12.367V services moving here November 2003  
 CLK, BTW3, Sky Racing (CA) feeds, tests  
 Aust, NZ 90 cm; 6 TV FTA  
 Aust, NZ 90 cm  
 Australia NA only (leakage to Norfolk, New Cal)  
 Aust, NZ 90 cm  
 Tests; unique NIT to this TR  
 Australia NA only (leakage to Norfolk, New Cal)  
 CA, subscription available Australia  
 Tests (CA)  
 Tests (CA)  
 CA, subscription available Australia, Norfolk  
 Tests (CA)  
 CA, subscription available Australia, Norfolk  
 CA, subscription available Australia, Norfolk  
 CA, subscription available Australia, Norfolk  
 Tests (CA)  
 CA, subscription available Australia, Norfolk  
 V832, A833; occ. power drops -10 dB  
 \* - plus 12.451H, 12.460H  
 \* - plus 12.293V, 12.402V, 12.411V  
 Full schedule less commercials - links  
 V1280, A1281; occ. 2nd channel (\* Sr varies)  
 PIDs vary; also try 12.360, 12.370  
 occ. digital feeds; typ. fa  
 Often NTSC; USA-Australia-NZ  
 Weekend footy feeds reported-FTA  
 Also 12.420H same params; SBS HDTV + w-s  
 FTA 4 channels (TVNZ x 4); + RWC will be here  
 testing digital feeds; Sr may vary  
 NDS CA, subscription available NZ  
 NDS CA, subscription available NZ  
 NDS CA, subscription available NZ  
 also 12.626, 643, 670, 688, & 706H  
 NDS CA, subscriptions available NZ  
 Radio SCPC is "cover" for high speed data  
 TPG/EurodecMDS CA, occ. FTA  
 TPG/Eurodec MDS CA, 1 radio FTA  
 TPG/Eurodec MDS CA  
 TPG/Eurodec MDS CA; 2 TV FTA  
 TPG/Eurodec MDS CA  
 June 2002-Irdeto-2 CA  
 Dateline west, east PAS2, 3901  
 PowVu CA  
 PowVu CA & FTA; subscription available  
 was PAS-2, previously 3992Vt  
 NET25 + FTA; new PIDS April; reload  
 PowVu CA; ch 11 DCP-CCP bootload; new FEC  
 PowVu/CA (some audio FTA)  
 PowVu CA & FTA (EWTN +)  
 NDS CA (6 channels); one testcard FTA  
 Myx FTA V1960, A1920 + radio FTA  
 Mixed FTA & CA; Taiwan Hallmark, STC  
 PowVu FTA, replaces PAS-2 svc  
 Difficult because of CCTV cross pole  
 was As2, PowVu CA  
 PowerVu  
 PowerVu; Asian MUX; new parameters Sept '03  
 # 8 MTV China FTA V289, A290; rest CA  
 24/7 English track 2 news; V4096, A4099 11-03  
 PowVu CA, WIN, ABC NT  
 PowVu CA, WA only - D9234  
 3m up (NZ); 1.8m up Australia  
 Occ FTA (Chile +); power reduction Sept. 2003  
 Sporting feeds (occasional)  
 Sporting feeds from USA (occasional)  
 feeds to (USA) pay-TV  
 PowVu (FTA) occ feeds  
 PowVu (FTA) occ. feeds  
 PowVu (FTA) occ sport feeds  
 PowVu(FTA) occ. feeds  
 PowVu (FTA) occ. feeds  
 Irdeto 2 CA - subscriptions avail; Strong Tech  
 PowVu (FTA) occ sport feeds  
 BBC, test card FTA, others nominally CA



# SATWORLD

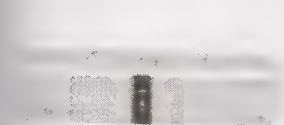
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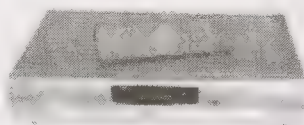
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Amplification TV

**TOPFIELD**

**HUMAX**



**Humax IR ACE S**



**eMTech 200**



**Dreambox 7000s**



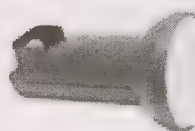
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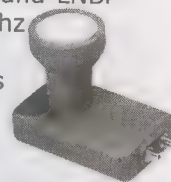


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Bird	Service	RF/IF & Polarity	# Program Channels	FEC	Msym
(PA2/169E)	Feeds	4040/1010H	1	3/4	10(850)
	7thDayAdv.	3872/1278H	1	3/4	6(620)
	Feeds	3868/1182H	1	2/3	6(620)
	Feeds	3939/1211H	2 (typ NTSC)	2/3	6(620)/7(498)
	Cal PowVu	3901/1249H	up to 8	3/4	30(800)
	HK bouquet	3850/1300H	up to 8	2/3	24(900)
	occ feeds	3776/1374H	1 typ	3/4	5(560)
	Korean Bqt	3771/1379H	1	3/4	9(041)
1804/176E	IPSTAR	12.619H	1	2/3	25(220)
	Tests-NZ beam	12.646H	1	3/4	22(418)
	RFO Poly	4027/1123R	1TV	3/4	4(566)
1701/180E	TNTV	11.060&11.514	9	3/4	30(000)
	Canal+Sat	11.610H	16TV, 1 radio	3/4	30(000)
	TVNZ	4195/955RHC	1	3/4	5(632)
	TVNZ/BBC	4186/964RHC	1	3/4	5(632)
	TVNZ	4178/972RHC	1	3/4	5(632)
	AFTS DTS	4175/975L	3 TV, 3 radio	2/3	3(680)
	TVNZ/Aptn	4170/980RHC	1	3/4	5(632)
	TVNZ/feeds	4161/989RHC	1	3/4	5(632)
	RFO-Canal+	4086/1064L	4TV, radio	5/6	12(041)
	TVNZ/feeds	4052/1098RHC	1	3/4	5(632)
	TVNZ feeds	4044/1106R	1	3/4	5(632)
	NZ Prime TV	4024/1126L	1	2/3	6(876)
	NBC to 7 Oz	3960/1190R	1	7/8	6(447)
	WorldNet	3886/1264R	1TV, 37 radio	3/4	25(000)
	Ioarana	3772/1378L	1	3/4	4(566)
	TVNZ	3846/1304R	1	3/4	5(632)
	10 Australia	3769/1381R	4	7/8	20(000)
	USA feeds	3749/1401R	4?	?	26(400)

Receivers and Errata
PowVu occ FTA feeds
Sat, Sun 0030, 0900+UTC?
FTA (occ sport); also try 3863, 86, 100
FTA-tyt NTSC-occ sport, live Shuttle
PowVu CA + FTA (BBC gone)
was 4148Vt; some FTA
occ feeds, typ FTA; also Sr 5.600
Korean MUX, reload 02/03
Tests, late May start; also 12.646H
Testing possible data links, June 2003
SE spot beam; was 4027LHC
east spot; 10TV + r each, vertical pol.
1+ FTA, MediaGd "2"; + 10.975 weaker
DMV/NTL early vers., occ feeds, typ ca
DMV/NTL early vers., occ feeds, typ ca
DMV/NTL early vers., occ feeds, typ ca
DTS' radio, TV audio FTA some IRDs
DMV/NTL early vers., occ feeds, typ ca
DMV/NTL early vers., occ feeds, typ ca
east hemi 20.5 dBw +; new Sr
DMV/NTL early vers., occ feeds, typ ca
SCPC, mixed CA and FTA feeds
PowVu CA; Auckland net feeds
CA, Leitch encoded
New Feb 2002; very strong NZ, Pacific
FTA SCPC, East Hemi Beam-Tahiti
SCPC, mixed CA & FTA, feeds
PowVu CA & TBN-JCTV FTA
16-QAM (not MPEG-2 compatible)

### MPEG-2 DVB Receivers: (Data here believed accurate; we assume no responsibility for correctness!)

Aston Simba 201. Embedded SECA (Zee, Canal +); review SF#97. MediaStar 61-2-9618-5777.

AV-COMM R3100. FTA, excellent sensitivity (review SF May 1998); new version Sept. '99. Av-COMM P/L, 61-2-9939-4377.

AV-COMM R3100(A). FTA, good sensitivity, ease of use exc (review SF May 2002). See above contact.

Benjamin DB6600-CL. FTA, Foxtel/Austar w/CAM+card. Autosat Pty Ltd 61-2-9642-0266 (review SF#72)

Coship 3188C. Review SF#107. Blind search FTA rcvr. Presently available from Satlink NZ. www.satlinknz.co.nz. "In our humble OPINION," buy with caution.

eMTECH eM-100B (FTA), eM-200B (FTA + Ch2), eM210B (FTA + 2xCl + positioner); KanSat 61-7-5484 6246 (review SF#89)

Humax F1-C1. Primarily sold for TRT(Australia), does (limited) PowerVu (not Optus Aurora approved).

Humax ICR1 5400 (Z). Embedded Irdeto + 2 CAM slots; initial units had NTSC glitch, now fixed. Widely available, SF#76.

Humax ICR1 5410 (Z). Adaptable version capable of holding multi-CA systems (SF#98, 99). Widely available.

Hyundai-TV/COM. HSS100B/G (Pacific), HSS-100C (China) FTA. Different software versions; 2.26/2.27 good performers, 3.11 and those with Nokia tuners also

good; later 5.0 not good. SATECH (V2.26)

Hyundai HSS700. FTA, PowerVu, SCPC/MCPC. Review SF March 1999. Kristal Electronics, 61-7-4788-8802.

Hyundai HSS800CI. FTA, Irdeto (with CAM) + other CA systems, PowerVu, NTSC. Kristal Electronics, above; review SF#63/

INNOVIA IDS32088. Review SF#111. Blind search FTA receiver. High quality IRD; no known source in Pacific but apparently available in Singapore.

ID Digital CI-24 Sensor. New August 2003; new lower noise tuner, extra sensitivity; CI Interface slot Irdeto 1 & 2; review SF#109. Sciteq 61-8-9409-6677.

MediaStar D7. FTA, preloaded w/ known services, exc. software (review SF July 1998). MediaStar Comm. 61-2-9618-5777

MediaStar D7.6. New (May 00) single chip FTA; review June 00 SF. MediaStar Comm. Int. 61-2-9618-5777

MediaStar D10. FTA and Irdeto embedded CA. VG receiver; see review SF#96, August 2002. Contacts immediately above.

MultiChoice (UEC) 660. Essentially same as Australian 660, not grey market contrary to reports. Sciteq tel 61-8-9306-3738

Nokia "d-box" (V1.7X). European, FTA, may only be German language, capable of Dr. Overflow software. SF#95, p. 14.

Nokia 9200/9500. When equipped with proper software, does Aurora, pay-TV services provided software has been "patched" with "Sandra" or similar program. See

SF#95, p. 14, SF#96 p. 15. SatWorld 61-3-9773-9270 (www.satworld.com.au)

Pace DGT400. Originally Galaxy (Nov Foxtel+Austar). Irdeto, some FTA with difficulty (Foxtel Australia 1300-360818). UECs replacing; Sept 18 (2003) "drop-dead"

day; all were to have been "turned off" on that date (in fact, those with V1.13 CAMs may still be working).

Pace DVR600. Original DGT400 modified for NBC (PAS-2)/RSA use, with CAM equivalent to DGT400 but more reliable.

Pace "Worldbox" (DSR-620 in NZ). Non-DVB compliant NDS CA including Sky NZ, no FTA; similar "Zenith" version.

Panasat 520/630/635. MCPC FTA, Irdeto capable, forerunner UEC 642, 660. Out of production, spares fax ++27-31-593-370. No longer work with Austar/Foxtel.

Panasonic TU-DS10. FTA + Irdeto CA; one of 2 IRDs approved by Optus for Aurora, but never available in Australia.

Phoenix 111, 222. PowVu capable, NTSC, graphics, ease of use. (111 review SF#57). SATECH(below)- 222; terminated

Phoenix 333. FTA SCPC, MCPC, analogue + dish mover. Detailed SF review SF#51. SATECH 61-3-9553-3399.

Pioneer TS4. Mediaguard CA (no FTA), embedded Msym, FEC, only for Canal+Satellite (AntenneCiel ++687-43.81.56)

PowerVu (D9223, 9225, 9234). Non-DVB compliant MPEG-2 unless loaded with software through ESPN Boot Loader (see below). Primarily sold for proprietary CA

(NHK, GWN+ P22-2 Ku, CMT etc). Scientific Atlanta 61-2-9452-3388.

PowTek. Blind Search Chinese sourced, field tests rate it highly. Possible source www.edigitallife.com (au?)

Prosat 2102S. FTA SCPC/MCPC, NTSC/PAL, SCART + RCA. Sciteq 61-8-9306-3738.

SatCruiser DSR-101. FTA SCPC/MCPC, PowVu, NTSC/PAL. (Skyvision Australia 61-3-9888-7491, Telsat 64-6-356-2749)

SatCruiser DSR-201P. FTA SCPC/MCPC, PowVu, NTSC/PAL, analogue, positioner - (Skyvision - see above).

SATWORK ST3618. Blind search FTA receiver. Fast search, problems, especially in "memory-filing" system; review SF#111. Available DMSi at time@dmsi.usa.com.

Strong Technologies SRT2620. SCPC, MCPC FTA, exc sensitivity, ease use, programming. Review SF#91 (ph. below).

Strong SRT 4600. SCPC, MCPC, PowerVu; exc graphics, ease of use, review SF#64. Strong Technologies 61-3-8795-7990.

Strong 4800. SCPC, MCPC, embedded Irdeto+ CAM slots, Aurora. Strong Technologies 61-3-8795-7990.

Strong 4800 II. SCPC, MCPC CAM slots x 2 for Aurora +, Zee, Canal +. Strong Technologies (above); review SF#103.

Strong 4890. SCPC, MCPC, 30Gb PVR, 2 CAM slots, DiSEqC 1.0, 1.2 (review SF#84); Strong Technologies, # above.

UEC Atlas/Titan. New July 2003, replacing DGT400 for Austar. No SCART, L-band loop; also available Rural Electronics 61-2-6361 3636.

UEC642. Designed for Aurora (Irdeto), approved by Optus; w/new software, C-band FTA; faulty P/S. Norsat 61-8-9451-8300.

UEC680. Upgraded UEC642, used by Sky Racing Aust., Foxtel-limited FTA. (Nationwide - 61-7-3252-2947); P/S problems.

UEC700/720. Single chip Irdeto built-in design for Foxtel; unfriendly for FTA. Power supply problems, seldom sold to consumers; propensity to fall off back of trucks.

Winersat DigiBox 200. C + Ku basic receiver but includes Teletext for NZ TVOne, 2 VBI. Satlink NZ, fax 64-9-814-9447

Xanadu. DVB compliant special-priced receiver for members of SPACE Pacific (Av-comm Pty Ltd, tel +61-2-9939-4377)

### Accessories:

Aurora smart cards. MYCRYPT (Irdeto V2) cards now available (Oct. 2003), Sciteq 61-8-9409-6677.

PowerVu Software Upgrade: PAS-8, 4020/1130Hz, Sr 26.470, 3/4; pgm ch 11 and follow instructions (do not leave early!)



# WITH THE OBSERVERS

## AT PRESS DEADLINE

JcSat2/BYU-TV 3915V may have changed Sr to 3.934, FEC remains 3/4. B3/152E 12.407V now has 14TV, 3 radio all CA but #1 ("TUNE 152E") TV and QTAB radio (#3 but labelled #10) which an Aurora card will play. Other B3 Vt include 12.594V (Sr 30.000, 2/3) w/loading table, no PIDs. Nov 4: 12.558H "lost FTA status" - see p. 28 here.

**AsiaSat 2/100.5E:** "Channel News Asia-CNA (As3S, 3706H) noted using 4091H (Sr 5.632, 3/4) as inward bound news feed link." (Shen, Tw) "3946V, Sr 6.110, 3/4 (VPID308, APID256) Asian Reuters feeds, AFC Asian Cup China." (BRichards, Aust) "Mixture of Sun-TV, Surya TV and KTV seen on 3752V, Sr 5.640, 3/4." (AZapara, WA)

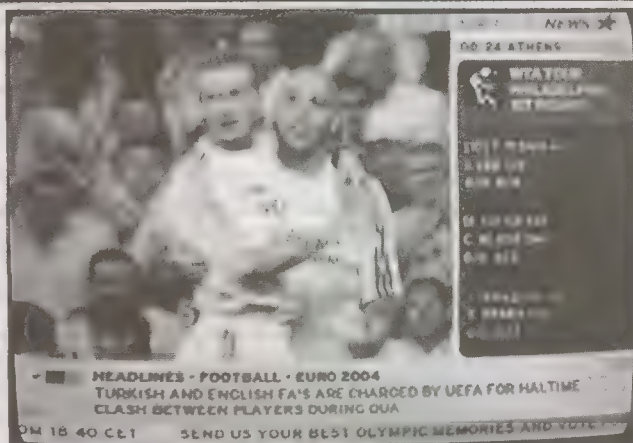
**I804/176E:** "Big time (15 dB) signal on 1m offset, 12.513V." (SJohnson, Auckland)

**JcSat2A/154E:** "BYU TV (3915V, Sr3.703, 3/4; V4377/A4385-4404 multiple languages) seen again with usual big-time signal." (AZapara, WA - Editor's note: BYU has two separate feeds - one is from KBYU-TV in Provo, Utah, operated by the Mormon Church there. The other is their international seminar series aimed at Mormons around the world. Neither are full-time on satellite in the Pacific)

**NSS6/95E:** "Believe 95E is correct for this one - not 96E previously listed. Also, I find a C-band bird almost on top of it (94.7E as I see it) with data; anyone else notice this one?" (DNolan, Aust).

**Optus B1/160E:** "Lovely 11.6 m/bit quality video on 12.398V, Sr 9.338, 3/4 during set-up for Australia vs Romania RWC!" (CS, NZ) "A bit odd (October 12th-a Sunday). On 12.378H, Sr 3.000, 3/4 a SCPC feed of the Bathurst 1000. This was not for TV rebroadcast, rather it began with an announcement welcoming viewers of Telstra's Big Pond to the event. The same race for broadcast TV use was elsewhere CA in NTL format. Simultaneously, Imparja in their normal Aurora service was carrying the same event with normal advertising breaks; meanwhile, on the Imparja 'Info Channel' they were rebroadcasting the same event without commercial breaks - for that time the 'Info Channel' was not accessible with a standard Aurora card." (NS, NSW)

**Optus B3/152E:** "12.595V, Sr 30.000, 2/3 has no loading table and whereas 12.407V a month ago was identical in content to 12.407V on C1, it now has several changes in place so folks should no longer be confused which satellite they are on here!" (AI, NSW - Editor's note: Sport [radio] 927, Retail Radio Network, TAB with APIDs of 35, 49 and 57 reported here; Irdeto V1.) "Aurora card will play QTAB radio channel on 12.407V." (IF, Qld) "Globecast move from C1 (12.367V) to B3 (currently 12.525V, Sr 30.000, 2/3) should be complete by end of November. Not all C1 services were apparent November 2 when found: (1) TAMIL TV, (2) ADHOC - Globecast test card, (3) ERT, (4) TGN (Thai), (5) FR2 (not running on 2nd) and radio (1) Radio Greece. Am not totally convinced Globecast is 'giving up' C1 12.367; possibly this



EUROsport News. Think of "CNN Headline News" for sports. As2, 3660H, Sr 27.500, 3/4 - FTA.

new B3 transponder is an expansion and some of their services will remain on C1?" (NS, NSW - Editor's note: there are many others who would "covet" their C1 transponder with NANZ coverage possibilities!) "TGN was erratic when first put up - PCR problem. Had to manually 'force' with PCR of 8190 rather than correct 1460." (BRichards, Aust) "Sydney Live-Cam noted 12.531V; VPID 1360, APID 1320." (BRichards, Aust - Editor's note: Was temporary 'fun'; same spot previously occupied by Globecast bars.)

**Optus C1/156E:** See updates page 28, here; many!

**Palapa C2M/113E:** "Indus Mux changes 4080 (Sr 28.125, 7/8); Prima Entertainment Channel VPID 517, APID 655; a test card V516/A654 and MQTV (Muslim) VPID 518/APID 656 also noted." (Plenty, NT) "Bali-TV operates sometimes 3926H, Sr 4.208, 3/4 (VPID33, APID36)." (RF, Qld)

**PanAmSat PAS8/166.5E:** "TARBS has added 3 Movie Network channels + National Geographic (12.526H, Sr 28.066, 3/4). Other recent changes: The only FTA radio channel currently is VOT (Voice of Turkey) (12.526H, 28.066, 3/4); TRT International and Thailand's TV5 remain FTA; there is also a new channel labelled 'PACE' (12.646, 28.066, 3/4 - decPIDS VPID 519, APID 647)." (AI, NSW - Editor's note: See p. 2 this issue for run-down on other TARBS changes). "JEDI/TVB bouquet (12.686H, Sr 28.126, 3/4) has a Nokia-load (but not UEC-load) channel labelled "ADB Code Download" - no V or A PIDS. All channels in this bouquet are Irdeto V2 CA." (NS, NSW) "12.273H, Sr 8.145, 3/4 appears to be a data feed (no loading table), found with Nokia

**WITH THE OBSERVERS:** Reports of new programmers, changes in established programming sources are encouraged from readers throughout the Pacific and Asian regions. Information shared here is an important tool in our ever expanding satellite TV universe. Photos of yourself, your equipment or off-air photos taken from your TV screen are welcomed. TV screen photos: If PAL or SECAM, set camera to f3.5-f5 at 1/15th second with ASA 100 film; for NTSC, change shutter speed to 1/30th. Use no flash, set camera on tripod or hold steady. Alternately submit any VHS speed, format reception directly to SatFACTS and we will photograph for you. Deadline for December 15th issue: November 30 by mail or 5PM NZST December 1st if by fax to 64-9-406-1083 or Email



**Almost all 20 C1 (Pacific) transponders in use!**

Vert #1/T1	12.305 =	12.305V	27(.800)	3/4	NA beam	No NIT, PAT	
Vert #2/T2	12.367 =	12.367V	30(.000)	2/3	NANZ beam		Globecast
Vert #3/T3	12.407 =	12.407V	30(.000)	2/3	NANZ beam	<u>home</u>	Aurora/home
Vert #4/T4	12.447 =	12.447V	27(.800)	3/4	NA beam	clone 12.606	
Vert #5/T5	12.487 =	?? Not in use	or very low	power SCPC			
Vert #6/T6	12.527 =	12.527V	30(.000)	3/4	NA beam		Aurora
Vert #7/T7	12.567 =	12.567V	27(.800)	3/4	NA beam	clone 12.606	was Auora
Vert #8/T8	12.607 =	<b>12.606V</b>	27(.800)	3/4	NA beam	test - ****	TVSN only
Vert #9/T9	12.647 =	12.647V	30(.000)	2/3	NANZ beam	No NIT, PAT	data only?
Vert #10/T10	12.709 =	<b>12.720V</b>	30(.000)	3/4	NA beam		Aurora
Hz #11/C11	12.296 =	<b>12.278H</b>	30(.000)	3/4	NB beam	(home-*)	A'star Interac.
Hz #12/C12	12.358 =	12.358H	27(.800) (b)	3/4	NB beam		pay-TV
Hz #13/C13	12.398 =	12.398H	27(.800)	3/4	NB beam		pay-TV
Hz #14/C14	12.438 =	12.438H	29(.473) (a)	3/4	NB beam	<u>home</u> -**	pay-TV
Hz #15/C15	12.478 =	12.478H	27(.800) (b)	3/4	NB beam		pay-TV
Hz #16/C16	12.518 =	12.518H	29 (.473) (a)	3/4	NB beam	***	pay-TV
Hz #17/C17	12.558 =	12.558H	27(.800)	3/4	NB beam	unique NIT	p-TV *****
Hz #18/C18	12.598 =	12.598H	27(.800)	3/4	NB beam		pay-TV
Hz #19/C19	12.638 =	12.638H	27(.800) (b)	3/4	NB beam		pay-TV
Hz #20/C20	12.700 =	<b>12.688H</b>	29(.473) (a)	3/4	NB beam	***	pay-TV

**Notations:**

(a) If by the time you read this transponders with Sr notation of (a) do not work for you, re-enter new Sr of 27.800 as a trial.

(b) There are unverified reports Irdeto V2 has been/is (also) being used on transponders so-marked.

\* - 12.278H contains full bouquet information and some IRDs may not load the full pay-TV set-up data unless using this transponder as "home."

\*\* - 12.438H is the standard "pay-TV home channel" at this time. The pay-TV transponders NIT loads 9 in the following sequence: #12, 15, 13, 18, 20, 14, 16, 11 and 19

\*\*\* - continued use of 29.473 may be temporary (12.518/12.700)

\*\*\*\* - NIT on 12.606V is only for itself as a stand-alone (test) channel

\*\*\*\*\* - As of 3 Nov, Tr 17 12.558H (27.800, 3/4) continued to be FTA and is not a part of the NIT load for pay-TV (no NIT, empty PAT). FTA on 3 Nov were: (1) TV1, (2) Showtime, (3) Comedy, (4) UKTV, (5) Arena, (6) CH6 (Fox Kids and Fox Classics), (7) Movie 1, (8) Fox 1, (9) W (apparently a new Women's channel, widescreen on 12.558), (10) History. Not all FTA receivers will play this transponder FTA (eMTech 200, with CAM, will - for example). *Around 7AM, 4th, this transponder lost "FTA status."*

**Errata:**

On 1 November all FX channels relabelled "W" (Austar 6, Foxtel 23) and Showtime 2 was added to Austar (ch 42).

There are now two channels labelled "SWP." 12.398H (27.800, 3/4, decPIDS VPID 1081, APID 1082 appears on "FSWP" bouquet). 12.518H (27.493, 3/4) decPIDS VPID 520, APID 648 appears on "Test" bouquet.

FFC for South Australia on 12.518H (29.473, 3/4) hexPIDS VPID 0209, APID 0289, is now relabelled FF2 and only appears in the "Test" bouquet.

**Advisory:**

The significant changes ongoing with C1 feeds, both Aurora and pay-TV, are probably not yet mature. Users should be aware that new changes in symbol rates (to 27.800) and swapping of programme channel contents within any specific transponder are likely to continue through the month of November and perhaps into December as well. All of this is to make way for the eventual 2004 changes that will see NDS encryption replacing Irdeto V1 for Foxtel and Irdeto V2 replacing V1 for Austar. Some day to day information can be found on [www.apsattv.com](http://www.apsattv.com).



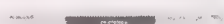





DVB2000." (IF, Qld) "ABS-CBN's ANG-TV, loading as APTN TV, 3.712V, Sr 3.260VPID 4096, APID 4099, PCR 4096 has all news all the time with English track on channel 2/B." (CS, NSW)

**Thaicom 2-3/78E:** "TARBS mux 3640H changed to 21.000." (PK)

**Soapbox:** "With no copyright laws that amount to anything on the books, PNG's sudden wealth of Foxtel/Austar signals on reasonable size dishes from C1 is fuelling a huge interest in private systems." (AR, NSW - Editor's note: And the signals are going well into eastern Indonesia [Timor - Dili, Kupang; Celebes - Pandang] according to reports received at SF.) "Optus has been swapping channels, replacing channels that were using Sr 29.473 with the (same) channels operating on Sr 27.800 transponders. The so-labelled 'Optus Bouquet' is being used as if it were an 'in-tray' on a desk housing the programme channels to be moved to 27.800. The 'Test Bouquet' has been used like an 'out-tray' on a desk to temporarily house the channels that have been moved from the Austar and Foxtel bouquets. It is my guess that channels will leave the 'Test' bouquet before the last 29.473 transponders have their symbol rates changed to 27.800. There are also hints they plan to retain 29.473 for at least the 12.438H (homing) transponder - remembering that if they change 12.438H from 29.473 to 27.800, there is one rather frightening moment when every IRD in both systems will be hanging in limbo with no home to go back to for a sanity check! And this overlooks that at any given moment in time, thousands of IRDs are unplugged,

disconnected, turned off and these would require an installer's assistance to get back running again. Interesting times, these!" (IF, Qld) "As part of their swapping exercise, Optus has been cloning T8/12.606V (27.800, 3/4) which contains TVSN running FTA (VPID308, APID 256, PCR 8190) onto T4/12.447V (27.800, 3/4) and T7/12.567V (27.800, 3/4). These typically have/had a network label of 'Foxtel' and a second label that appears on Nokia and Humax is 'Tandberg' which identifies the apparent supplier of the NDS format CA which Foxtel will be using in 2004." (AI, NSW) "AsiaSat has leased Ku band transponders to Boeing Aircraft's Connexion in-flight data service starting up on Asia-European flights during first months of 2004. Using As3S, passengers flying in either direction (Asia-west, Europe from Turkey east) will have real time e-mail and Internet access. Tests conducted by Connexions substantiates that As3S Ku along the Turkey - Singapore/Japan corridor will provide direct real time access; can HBO be far behind?" (Frank G, Tokyo) "Reference Coop's Comment SF#110; does not surprise me someone has worked out VHS quality at 256 kbps; Windows Media 9 fine print suggests 'DVD quality' at around 500 kbps." (CS, NZ) "Those with a passion for inane detail and interest in blind search receivers information might check out the information on <http://homepage2.nifty.com/furuno/TVRO/CDVB3188C.htm>; Mandarin, but links provided and chip usage information. The Fujitsu MB87L2250, by the way, is pretty ancient as a processor goes; 1999 origin. (RU, NZ) "Have not checked out [www.tvfreak.com.au](http://www.tvfreak.com.au) but am told it carries complete schedules

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<b>ALL PRICES EXCLUDE GST, THIS MONTH SPECIALS!</b>																			
<b>Arion 1200</b> (PRICE DROP)		<b>Success 5860</b> (PRICE DROP)		<b>Supernet</b> (SPECIAL)															
																			
<ul style="list-style-type: none"> <li>- Free to air</li> <li>- Fast processing</li> <li>- User friendly</li> <li>- Slick design</li> <li>- <b>\$200 AUD</b></li> </ul>		<ul style="list-style-type: none"> <li>- Fast process</li> <li>- <b>EXTREMELY</b> User friendly</li> <li>- <b>All the functions</b> you can possibly want in a FTA receiver</li> <li>- <b>\$160 AUD</b></li> </ul>		<ul style="list-style-type: none"> <li>- IRDETO 2.09 Embedded</li> <li>- Symbol Rate Range from 2 - 45</li> <li>- Suitable for LBC/AURORA</li> <li>- Autoscanner Function (Unique to this receiver)</li> <li>- <b>\$250 AUD</b></li> </ul>															
<b>Dion CI + CAM</b> (PRICE DROP)		<b>Supernet TERRESTRIAL RECEIVER</b>																	
																			
<ul style="list-style-type: none"> <li>- With Cam IRDETO 2.00S</li> <li>- Nice interface design</li> <li>- 2 CI slots</li> <li>- User Friendly</li> <li>- Symbol Rate from 2 - 45</li> <li>- <b>\$370 AUD</b></li> </ul>		<b>(NEW) DVB-T</b>																	
<b>Accessories</b>		<b>Solid/Mesh Dish</b>																	
2.4G AV sender - \$120 AUD Special LNB CBand Zinwell - \$40 LNB CBand 1 Cable solution - \$70 LNB KU - \$35 LNB KU Twin output - \$75 SPECIAL Actuator SuperJack 18" - \$50 Actuator SuperJack 24" - \$55 Positioner EZ2000 - \$60 SPECIAL!!! Positioner SAP2200 - \$85 Positioner VBox Diseq 1.2 - \$70 Cable RG6 Dual Shield - \$70/305m Cable RG6 Quad Shield - \$80/305m Actuator Cable CAT5 - \$80/305m		<table border="1"> <tr> <td>0.45 m</td> <td>2.13m</td> </tr> <tr> <td>0.6 m</td> <td>2.3m</td> </tr> <tr> <td>0.65 m</td> <td>3.07m</td> </tr> <tr> <td>0.8 m</td> <td>Light Duty</td> </tr> <tr> <td>0.9 m</td> <td>Medium Duty</td> </tr> <tr> <td>1.2 m</td> <td>Heavy duty</td> </tr> <tr> <td>1.8 m</td> <td>available</td> </tr> </table>				0.45 m	2.13m	0.6 m	2.3m	0.65 m	3.07m	0.8 m	Light Duty	0.9 m	Medium Duty	1.2 m	Heavy duty	1.8 m	available
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0.9 m	Medium Duty																		
1.2 m	Heavy duty																		
1.8 m	available																		
<b>IRDETO 2.06B CAM</b> (PRICE DROP)		<b>Banking Details</b>																	
		<b>ANZ Bank</b> <b>Branch 012432</b> <b>Account 3474 57536</b>																	
Price: \$160 We import this product		Suitable for all channels from Optus B3																	
<b>VERY easy to use, Specially designed for housewives</b>		<b>From \$25 - \$200 AUD</b>																	
EPG for up to 64 DAYS! Teletext function RCA/S-VIDEO/RGB/SCART Outputs 16x9 and 4x3 widescreen <b>\$210 AUD</b>		<b>From \$130 - \$550 AUD</b>																	



for ALL stations in Australia." (Arnold) "CRC makes an aerosol product called LANOSHIELD which is spray-on corrosion-inhibitor containing Lanolin. Might be a good approach to dish systems where salt-spray corrosion is a problem." (IF, Qld) "On Austar go to ch 31 for the 'A' interactive weather service; punch in your postal code and every ten minutes see a localised weather report." (AI, Victoria) "Some background on Globecast when they were bringing up TGN for the first time (B3, 152E). On a Prosat P2102 I had Thai audio, no video. On Nokia 9500S I had picture but no sound. PCR entry (8190 as default) was answer." (BRichards, Aust - Editor's note: Craig Sutton found the audio sampling rate on TGN initially was 32 kHz whereas the balance of the MUX was 48 kHz.) "Telstra has begun offering a 10% discount on Austar subscriptions when 'bundled' with Telstra landline services. The small print sets the conditions: 'Austar from Telstra not available in all areas.

Discount does not apply to TV Guide, Pay per View, Adults only and World Movie. 10% discount applies when Telstra full service home phone and Austar from Telstra are combined with an eligible Big Pond Internet or Telstra Mobile service on the one bill.' My read of this - a further step towards the day when Foxtel gobbles up Austar." (AI, Victoria) "Erosion of DVB-set top box pricing continues in small steps - Big W had Thomson units at A\$284 in mid-October." (IF, Qld) "Satwork update: If you download version 6.01 software from their web site, it will now do blind search of symbol rates down to 2.000 (previously limited to 3.700). However, the search speed now appears to be slower - on a par with the Coship 3188C." (Roy Carmen, UK) "The address is long but the information there may have some relevancy on 'scanning satellite receivers'; <http://www.internetnz.net.nz/public/committee-reports/ctte-leg-al-and-regulatory-affairs/larac030708crimes-amendment-6.htm> l. In a nutshell, they wish to change the 'rules' governing what you can and cannot 'tune-in'." (SatelliteMan, NZ) "Sky NZ has renewed its contract with Optus, due to expire in 2006, for an additional 15 years." (JF, Auckland) "The ACCC has decided that the free to air terrestrial networks if they wish to be carried within the Foxtel (and/or Austar) satellite bouquets will have to pay their share of satellite transponder space. The stations had argued they should be carried as a matter of public entitlement to FTA broadcasts; Foxtel/ Telstra argued their satellite service is 'private' and if channels 7 and 10 'want a ride' they can pay for that privilege." (AR, Sydney) "Sky NZ's carriage of 'The History Channel' to commence 1 December will be on a feedthrough basis (like NGE0) as the service is received in Auckland by Sky from the C1 Foxtel MUX." (OE, NZ)

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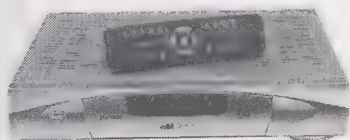
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eM150 Free to air receiver, compact size,  
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# AT

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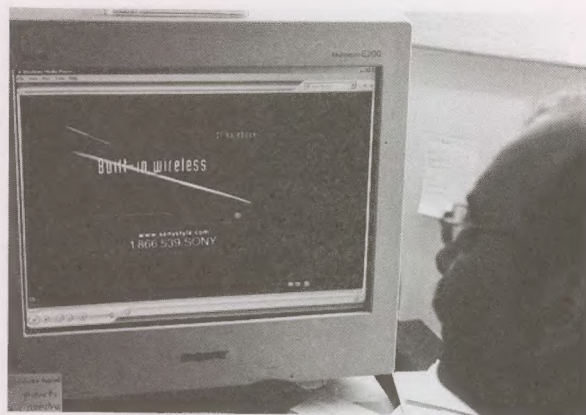
**Wired versus wireless.** Over the air television is called wireless because for the majority of the trip between TV transmitter and TV receiver, there are no connecting wires. Satellite TV is "wireless" for the same reason. Commercial exploitation of wireless began with Marconi; wired with Bell. Wire has a built-in "security" wall - you must be plugged directly into the wire to participate. Wireless, when and where security appropriate, creates artificial security walls with encryption technology. Using an addressing system, wired can be operated as a "point-to-point" system; one "transmitter" connected to "one receiver." If each wired-location in the world has a unique numerical identifier, connecting one location to another specific location is but a set of dialled numbers away. Wireless can also be operated as a "point-to-point" system but as the radio waves linking point "A" to point "B" flow (often unpredictably) in many directions simultaneously, Marconi's ultimate contribution was the ability of radio to do "point to multipoint."

Internet is rapidly evolving from a "point-to-point" technology to a "point-to-multipoint" system. Ten years ago, anyone writing about the "promise" of Internet was obsessed with the view Internet would only amount to something *after* hundreds of millions of miles of pre-existing "copper wire" were replaced with something more "bandwidth friendly" - such as coaxial cable, or fibre optic. This was in a decade when only the most optimistic wired network engineers believed that innovative ways would be developed to force/send high speed, big bandwidth information streams through copper wire networks designed around the parameters of telephone systems 50-60- or 70 years ago.

In the photo appearing above, New Zealander Eric Shackleton, a Pharmacist by trade with a business in Kaitia, New Zealand, is watching a TV image. It might look like a PC display of some sort of software program but in fact the entire display is from a commercial TV message being broadcast at that same instant some 8,000 miles away in New York - the city. Eric's 486-era PC is connected through a Telecom NZ consumer grade service called "Jetstream" from his telephone number in NZ to someone else's telephone number in New York.

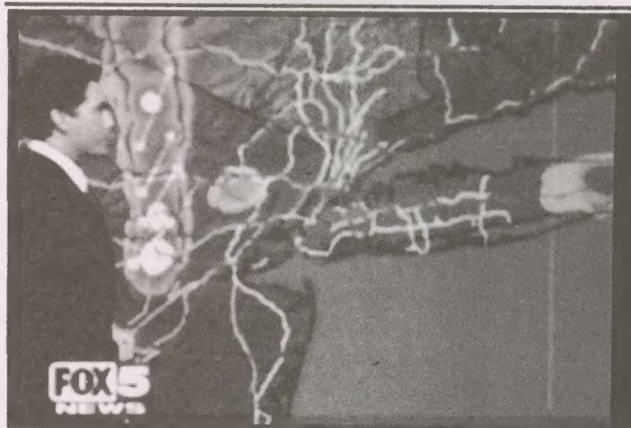
In New York, a very clever group of people have taken a Marconi-grade step forward by attacking the major stumbling block to sending quality TV service through the "wired" network already in place world-wide. It is for the moment premature to explain how they do this because there are obvious commercial benefits to be awarded to these clever people if they can make the transition from Eric's New Zealand PC to "multipoints" spread throughout the planet we all live upon.

Let us just say for now that Eric, using his keyboard or a uniquely formatted handheld remote control unit (RCU), selects the TV channel he wishes to view, has access to a complete on-screen TV guide for a whopping 250 channels,



NOT built-in wireless. In fact, "wire" all the way from New York to Kaitia, New Zealand. Flagship station WCBS with local news commercial for a newly USA-available Sony product.

BELOW - News Corp's New York channel 5 weather forecast for "the city."



and should he tire of staring at his 17" PC screen, can transfer the NTSC originated - now PAL - delivery to his standard TV receiver's A-V input sockets with a simple command.

This sort of "science fiction" has been budding for several years. A French group (<http://www.tvbrick.com>) with Asian technical support has been selling a similar "system" since July. Their "market approach" is to entice folks from, say Japan, living and working in Europe to buy their product (around US\$1,000) thereby allowing them, from Europe, to watch "home town TV" - from say Tokyo. TVBRICK has one major technical shortcoming - it only transmits (a maximum of) 9 complete video frames per second (Japan's NTSC being 30 fps, PAL be 25 fps) which means you have a thinned-down "slide show" version of the images. OK - you do get the "real sound" without alteration.

Microsoft during October announced they are within "one year" of delivering "through the telephone line to your home" TV service; a trial is underway right now in Canada. All of this is "leading edge" stuff - with the Holy Grail being the system that does it best, cheaply, the fastest. All without being a direct threat to the folks who really control the courtroom keys here - the copyright holders.

*Mark these words.* The TV delivery world is about to implode. Every man and his dog with a vested commercial interest is heading to the battle. And the lawyers are already circling overhead preparing for the great feast to come.



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### Hard Core (Serious) "How to do it" References

- ☐ Tech Bulletin (TB) 9402: MATV (master antenna terrestrial) systems - wiring up a home, motel, hotel, camp site from one set of antennas - \$15 all regions
- ☐ TB 9404: Home Satellite Dish Systems. "Newbie" trying to work out what all those terms means and how a home system goes together? Perfect. \$15 all regions
- ☐ TB9405: Satellite to Room Systems. Combining MATV (9402) with satellite (9404) to distribute satellite TV reception to multiple outlets - 2 to 1000+! \$15 all regions.
- ☐ TB9301: Terrestrial Antenna Systems to eliminate co-channel interference, stack for additional gain. \$15 all regions.
- ☐ TB9302: (Terrestrial) Weak Signal Reception Techniques; off-air TV reception to 300km+. Seriously detailed. \$15 all regions.
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- ☐ TB9304: Identifying and eliminating noise interference from fence lines, signs, electrical appliances. How to cleanup marginal TV reception. \$15 all areas.
- ☐ TB9305: Cable TV - the basics. How a cable system works, how you can build one! \$15 all regions.
- ☐ Nelson Parabolic Manual. The "bible" of building your own 13 foot dish from scratch. Serious stuff for dedicated builders. \$15 all regions (supply limited).

### SOFT CORE - recent back issues of SatFACTS (while supply lasts)

- ☐ SF#93 (May 2002) - European Piracy, hundreds of piracy web sites - \$10 all regions.
- ☐ SF#96 (August 2002) - Nokia BDM, Faster Channel Zapping with Nokia - \$10 all regions
- ☐ SF#97 (September 2002) - Turning FatCAMs into multiCAMs - \$10 all regions
- ☐ SF#99 (November 2002) FunCARDS - how they work, software mods for Humax - \$10 all regions
- ☐ SF#100 (December 2002) d-box2 BIG report! AC3 Surround Sound for Nokia, PanAmSat's Terrorist Problem - \$10 all regions
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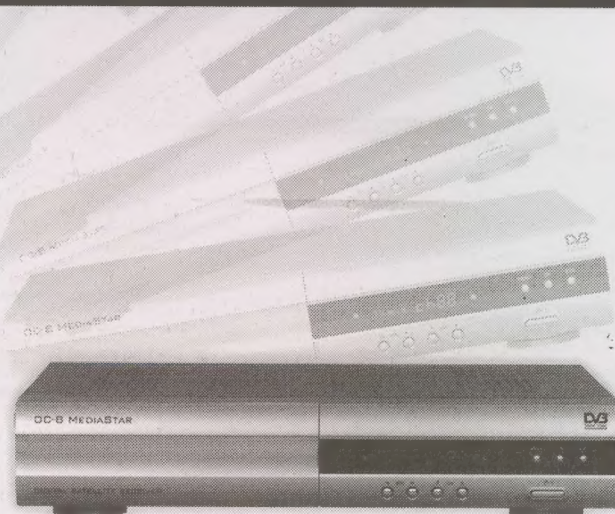
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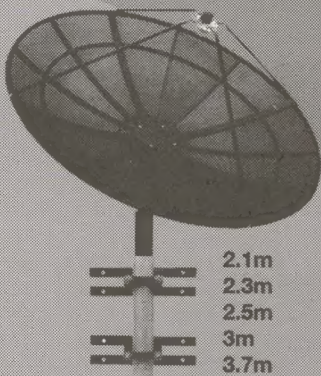
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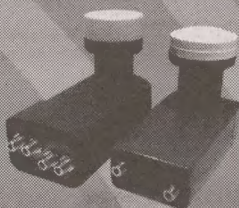


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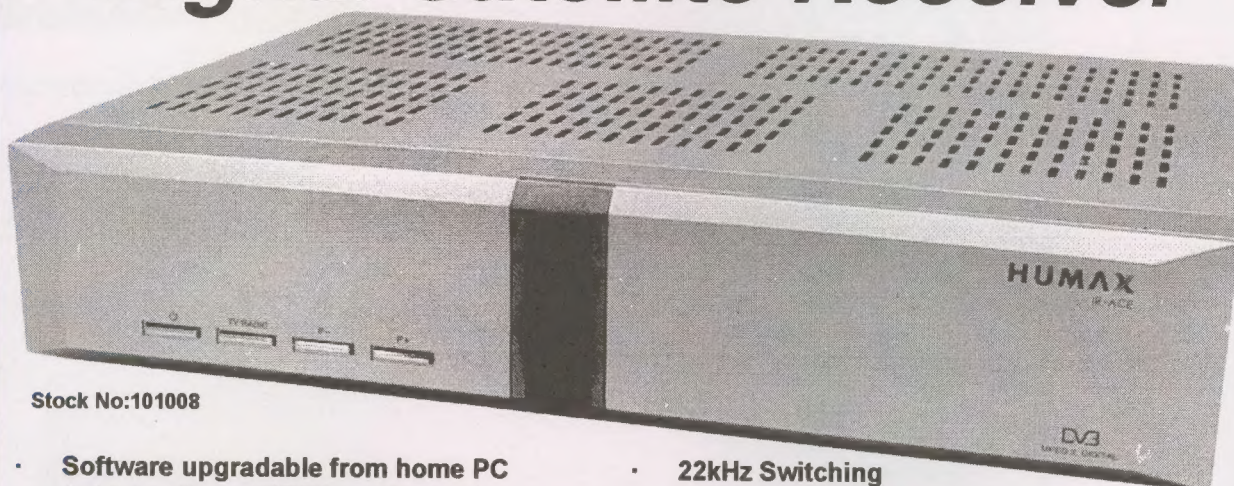
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Audio Decoding MPEG/MusiCam Layer I & II  
Audio Mode Single channel/Dual channel  
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Graphic Engine 3-OSD plane  
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RF-Connector 75  $\Omega$ , IEC 169-2, Male/Female  
Frequency 470 ~ 860 MHz  
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